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DRILL REGULATIONS
FOR
FIELD COMPANIES OF THE SIGNAL CORPS
(PROVISIONAL)

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DRILL REGULATIONS

FOR

Field Companies of the Signal Corps

(PROVISIONAL)

Edition of March, 1911

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WAR DEPARTMENT,
OFFICE OF THE CHIEF SIGNAL OFFICER,
Washington, March 27, 1911.

The following Provisional Drill Regulations for field companies of the Signal Corps, prepared under the direction of the Chief Signal Officer of the Army, are approved and published by authority of the Secretary of War. In order to insure uniformity throughout the Signal Corps, these regulations only shall be used in the instruction of field companies from the date of their receipt. Commanding officers of field companies will submit to the Chief Signal Officer of the Army not later than November 1, 1911, any suggestions or recommendations relative to these drill regulations which they think will add to their value.

JAMES ALLEN,
Brigadier General,
Chief Signal Officer of the Army.

211808

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PART 1.

GENERAL PRINCIPLES AND DEFINITIONS.

CHAPTER 1.—GENERAL PRINCIPLES.

SECTION 1.—*Instruction.*

Object of the Instruction.

1. The certain transmission of information and orders from commanding officers to their subordinates and information from subordinates to commanding officers, regardless of conditions or terrain, is the goal to be kept constantly in view in peace training. School and drill ground training must not be allowed to obscure this.

2. The special qualifications required of Signal Corps troops in war are the ability, first, to be in position fully equipped with efficient men and matériel to carry out the orders of the commanding officer; second, to maintain, uninterruptedly, such communication, either by electricity or visual signaling, or both, without regard to change of headquarters, as will keep the commander fully and continuously informed as to the progress of the action, the position of his troops, hospitals, trains, and supply departments.

To meet the first requirement, the Signal Corps must have men, technically trained in time of peace; and it must also be prepared to cover long distances as quickly as Cavalry or Artillery, and to overcome all the difficulties and obstacles of the route, and still keep in touch with such subordinate commanders as orders require.

To meet the second requirement the personnel must understand thoroughly all classes of signaling; must know how to repair the necessary matériel, and must be prepared to meet, tactically, the shifting requirements of the battle field and the strategical condition of the occupied territory.

Mobility, thorough theoretical training, and extensive practice in establishing and maintaining lines of information over varied country under conditions approximating those of service, are the essentials.

3. An additional object of instruction is to develop resourcefulness, initiative, and self-reliance on the part of Signal Corps men of all grades.

The regulations prescribe a method of training in the ordinary duties of field companies and battalions of the Signal Corps. The personnel must be so thoroughly drilled in these duties that in the excitement of action the same may be performed readily, naturally, and as a matter of second nature.

On account of the varied conditions that arise in handling Signal Corps troops, no hard and fast rules can be laid down to cover all conditions. As a consequence much is left to the energy and ingenuity of the officers and noncommissioned officers.

4. Instruction in peace must therefore be conducted with a view, first, to drilling the personnel thoroughly in their habitual duties; and second, to affording officers and men practice and experience in dealing with the situations and difficulties apt to arise in campaign.

5. Solutions of practical problems, involving at first simple tactical situations with appropriate units, should be required. These should be progressive to include the use of the higher tactical units. Signal troops can carry out this instruction to advantage without the assistance of other troops.

6. Systems of instruction or of matériel can be perfected only by actual use by troops. To the end that true progress may be made, officers and noncommissioned officers will be encouraged to make suggestions, based upon their practical experience, in regard to methods of instruction as well as in regard to the different electrical and mechanical features of the matériel. The experience of those most competent to judge of the merits of such systems will thus be made available for future improvements therein.

Sequence and Methods of Instruction.

7. A progressive order will be followed in all instruction, which should commence with theoretical instruction in the smallest unit, and proceed to the larger ones, culminating in field maneuvers. (See par. 5.)

8. Thorough training of the individual soldier is the basis of efficiency. Great precision and attention to detail are essential to this instruction, for from it the soldier must acquire that habit of implicit obedience to orders, and of accurate performance of his individual duties, which is the indispensable requisite for efficiency in combined training.

9. Recruits should be assembled in small squads for the beginning of their instruction. As the instruction progresses it may be consistently carried on by sections, platoons, or by the entire company. This principle will apply to technical training as well, particularly to visual signaling, telegraphy, and telephony. Grouping according to progress and efficiency should be strictly carried out. Those who lack aptitude and quickness should be placed under experienced instructors.

The training of the recruit will include instruction in the duties of sentinels, the care of equipment, packing of field kits, tent pitching, pistol practice, and the customs and courtesies of the service, in addition to his training as a signalman.

10. Short and frequent drills are better than long ones, which exhause the attention of both the instructor and recruit.

11. The instructor of each unit is habitually its immediate chief, and should be given all due latitude in conducting the instruction, and be held to strict accountability for results attained. The habit of self-reliance and a feeling of responsibility for the instruction of their respective units, as well as a proper feeling of pride therein, may thus be developed among the subordinate commanders.

The instructor will always maintain a military bearing, and by a quiet, firm demeanor, set a proper example to the men. Faults should be gradually corrected without nagging.

12. Instruction in establishing wire, wireless, or visual lines of information, telegraphy, and tent pitching may appropriately be given by section or by platoon, as a healthy rivalry among the units may thus be developed.

SECTION II.—*General rules.*

13. Movements that may be executed toward either flank are explained as toward but one flank, it being necessary merely to substitute ***left*** for ***right,*** or the reverse, to have the explanation of the corresponding movement toward the other flank.

14. Any movement may be executed either from the halt or when marching, unless otherwise prescribed.

15. All movements on foot not especially excepted may be executed in double time If the movement be from the halt, or when marching in quick time, the command ***double time*** precedes the command ***march;*** if marching in double time, the command ***double time*** is omitted.

16. All mounted movements not especially excepted may be executed at the trot or gallop.

17. The gait should habitually be increased or decreased progressively, the trot being executed from the walk, and the gallop from the trot. If marching at the gallop, the gait will be decreased to the trot, then to the walk, before halting; if marching at the trot, the same rule applies, halting from the trot or gallop being considered an exceptional movement.

18. To execute a movement at the trot or gallop the command ***trot*** or ***gallop*** precedes the command ***march,*** unless already marching at the gait desired.

19. Movements or procedures explained for the smaller units are, in general, applicable to the larger ones when under instruction of the same character, the commands being modified so as to be adapted to the particular unit dealt with.

20. The intervals and distances prescribed are in general such that, if marched by the flank from line, the elements will be in column at proper distances; or if marched by the flank from column, they will be in line at proper intervals. Similarly, if marching obliquely, a second oblique will place the elements in line or column, as the case may be, at proper intervals or distances. If, however, due to differences of length of elements, these conditions do not accurately obtain, the proper intervals or distances are gradually secured by appropriate modifications of the gait.

21. If, in forming elements abreast of each other, the commands: 1. ***Company (platoon, etc.),*** 2. ***HALT,*** be given during the movement, only those elements halt which have reached their

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new positions; the others continue the march and halt on reaching their positions.

22. For the purpose of correcting errors while marching, the instructor may command: 1. *In place,* 2. *HALT;* when all halt and stand fast. To resume the march, he commands: 1. *Company (platoon, etc.),* 2. *MARCH.*

23. To revoke a preparatory command, or being at a halt, to begin anew a movement improperly begun, the instructor commands: *AS YOU WERE,* at which the movement ceases and the former position is resumed.

24. If a change of formation requires a change of post of officers and noncommissioned officers, they proceed by the shortest route to their posts in the new formation.

25. While the posts of officers and noncommissioned officers are specified in the text, as instructors they go wherever their presence is necessary.

26. Officers and noncommissioned officers who are absent are replaced ordinarily by the next lower in rank. In a company, chiefs of platoon are replaced by the chiefs of sections of the platoon in the order of rank. The first sergeant, if performing the duties of an officer, and the supply and stable sergeants, are not replaced. Sergeants and corporals replace absent chiefs of section.

27. The numerical designation of units does not change, as their relative order in line or column is changed.

SECTION III.—*Commands.*

28. Commands are of two kinds: *Preparatory commands* and *commands of execution.*

The preparatory command, such as *forward,* indicates the movement that is to be executed.

The command of execution, such as *MARCH, HALT,* causes the execution.

Preparatory commands are distinguished in the text by *italics;* those of execution by *capitals.*

29. The commands prescribed in the text are given by the instructor, except when otherwise specified.

30. To permit the preparatory command being understood, a well-defined pause should be made between it and the command of execution. The duration of this pause depends in a measur

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upon the size of the body of troops under command, and upon whether the troops are dismounted or mounted. Ordinarily, in dismounted movements and in mounted movements executed from a halt, the pause should be brief and of uniform duration, as otherwise uncertainty is communicated to the ranks, and a ragged execution of the movement results.

31. The tone of command is animated, distinct, and of a loudness proportioned to the number of men under command. Indifference in giving commands leads to laxity in execution.

Each preparatory command is pronounced in an ascending tone of voice, but always in such a manner that the command of execution may be more energetic and elevated.

On foot the command of execution is pronounced in a firm, brief tone.

In mounted movements the preparatory commands are more or less prolonged to insure their being heard; the command of execution is always prolonged.

When giving commands to troops, it is usually best to face or look toward them.

32. To secure uniformity, officers and noncommissioned officers are practiced in giving commands.

33. The bugle calls and prescribed arm signals are frequently used in instruction in order that the officers and men may readily recognize them.

CHAPTER II.—DEFINITIONS.

34. ***Alignment:*** A straight line upon which several men, teams, carts, or bodies of troops are formed, or are to be formed.

Base: The element on which a movement is regulated, or on which a formation is made.

Center: The middle point or element of a command.

Column: A formation in which the elements are placed one behind another.

Depth: The space from head to rear of any formation, including the leading and rear elements.

Disposition: The arrangement of the elements in a formation.

Distance: Open space between elements in the direction of depth.

Element: One of the similar parts of a larger unit—as a file, squad, team, cart, wagon, section, platoon, company, etc.

Facing distance: The difference between the front of a man in ranks, including his interval, and his depth—about 14 inches.

File: Two men—the front-rank man and the corresponding man of the rear rank. The front-rank man is the *file leader.* A file which has no rear-rank man is a *blank file.* The term *files* applies also to individual men in single-rank formation. A single mounted man in ranks is also called a file.

File closers: The noncommissioned officers, and men acting as such, who, in dismounted formation, are posted 2 yards in rear of the line.

Flank: The right or left of a command in line or column; also the element on the right or left of a line.

By the enemy's *right (left) flank* is meant the flank which the enemy himself would so designate.

Formation: Arrangement of the elements of a command in their order in line, in column, or for battle.

Front: The space in width occupied by a command either in line or column. The term *front* is also used to denote the direction in which the elements of a command face, as well as to denote the direction of the enemy.

Guide: An officer, noncommissioned officer, or private upon whom a command or an element thereof regulates its march.

Interval: Open space between elements abreast of each other.

Left: The left extremity or element of a body of troops.

Line: A formation in which the different elements are abreast of each other. When the elements are in column, the formation is called a *line of columns.*

Lines of information: Channels along which military information may be transmitted, as wire, wireless, visual, or messenger.

Maneuver: A movement executed by a company or larger unit for the purpose of changing from one formation to another.

Rank: A line of men, horses, teams, or carts, abreast of each other.

Right: The right extremity or element of a body of troops.

PART II.

DISMOUNTED INSTRUCTION.

CHAPTER I.—GENERAL RULES.

35. Field companies will habitually turn out mounted and with full equipment for all drills and ceremonies. Therefore only so much dismounted instruction will be given as is necessary for the training of recruits and for the few occasions when the company is obliged to be dismounted.

36. Formations are habitually in double rank. The men always fall in at attention.

37. The interval between men in ranks is 4 inches; the allowance for the front of a man is taken at about 26 inches, including the interval; the depth about 12 inches. The distances between subdivisions in column is measured from guide to guide.

38. To secure uniformity of interval between files, when falling in, and in the alignments, each man slightly opens out his right elbow, lightly touching the left elbow of the man on his right, and he drops it when the intervals has been secured.

39. When marching in flank column, the leading man of the leading rank is, without indication, the guide of the column.

During the oblique march the leading man of the leading rank is, without indication, the guide.

40. When marching in line, the guide is always announced as soon as the march is begun, or as soon as the line is formed. On marching to the rear from line, or on taking the full step after a turn, the guide is announced as soon as the march in the new direction is begun. For example:

Being in line at a halt:

1. ***Forward,*** 2. ***MARCH,*** 3. ***Guide (right or left).***

Being in line:

1. ***Right (or left) oblique,*** 2. ***MARCH,*** 3. ***Forward,*** 4. ***MARCH,*** 5. ***Guide (right or left).***

Marching in line:

1. ***To the rear,*** 2. ***MARCH,*** 3. ***Guide (right or left).***

CHAPTER II.—THE SOLDIER DISMOUNTED.

SECTION I.—*General provisions.*

41. This instruction has for its object the training of the individual recruit and afterwards that of the squad. It must be given with the greatest attention to detail.

42. In the instruction of the recruit, frequent short rests should be given, in order that the men may not be unduly fatigued.

The instructor will take advantage of these rests to instruct the recruits in the customs and courtesies of the service, the duties of orderlies, the proper manner of receiving messages from and delivering them to officers, etc., so that when the recruit is finally reported for duty he will not only know his prescribed drill thoroughly, but will know how to conduct himself out of ranks as a trained soldier.

43. From the beginning the instructor will insist on a smart appearance of the recruits, and will require that their clothing be clean and neatly adjusted.

44. The instructor briefly explains each movement, at first executing it himself if necessary. He exacts by degrees the desired precision and uniformity.

SECTION II.—*The recruit.*

45. For the individual instruction, a few recruits, usually not exceeding four, are placed in a single rank, facing to the front and about 4 inches apart.

They execute the marchings as explained for a squad.

Position of the Soldier, or Attention.

46. Heels on the same line and as near each other as the conformation of the man permits.

Feet turned out equally and forming with each other an angle of about 60°.

Knees straight without stiffness.

Body erect on the hips, inclined a little forward; shoulders square and falling equally.

Arms and hands hanging naturally, backs of hands outward; little fingers opposite the seams of the trousers; elbows near the body.

Head erect and square to the front, chin slightly drawn in without constraint, eyes straight to the front.

To Assemble.

47. To teach the recruits to assemble, the instructor will first place them in a single rank arranged according to height, the tallest man on the right with intervals of 4 inches, as nearly as may be between men, and explain that the objects of the interval are to give freedom of movement in marching; then direct them to open out the right elbow slightly until the left elbow of the man on the right is lightly touched and then withdraw the elbow; this repeated a few times, he will cause the recruits to fall out and, placing the man on the right in position, will instruct them that at the command ***FALL IN*** they will successively and quickly take their places in rank as before, each assuring himself of his interval by making the touch by the elbow and then withdrawing the elbow. He then commands: ***FALL IN,*** when they assemble rapidly as above prescribed.

The Rests.

48. Being at a halt, to rest the men: ***FALL OUT,*** or ***REST,*** or ***AT EASE.***

At the command *fall out,* the men may leave the ranks, but will remain in the immediate vicinity.

At the command *fall in,* they resume their former places at *attention.*

At the command *rest,* each man keeps one heel in place, but is not required to preserve silence or immobility.

At the command *at ease,* each man keeps one heel in place, and preserves silence, but not immobility.

If marching: 1. ***ROUTE ORDER,*** or, 1. ***AT EASE.***

The men keep their places in the squad, but are not required to keep the cadence step; at *route order,* they are not required to preserve silence.

To resume the attention: 1. *Squad,* 2. ***ATTENTION.***

The men take the position of the soldier and fix their attention.

49. 1. ***Parade,*** 2. ***REST.***

Carry the right foot 6 inches straight to the rear, left knee slightly bent; clasp the hands in front of the center of the body, left hand uppermost, left thumb clasped by thumb and forefinger of right hand; preserve silence and steadiness of position.

50. To resume the attention or position of the soldier: 1. ***Squad,*** 2. ***ATTENTION.***

The men take the position of the soldier and fix their attention.

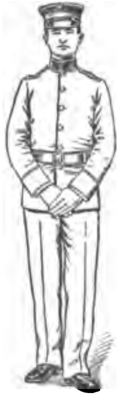
51. To dismiss the squad: ***DISMISSED.***

Facings.

52. To the flank: 1. ***Right (Left),*** 2. ***FACE.***

Raise slightly the left heel and right toe, face to the right, turning on the right heel, assisted by a slight pressure on the ball of the left foot; place the left foot by the side of the right. Left face is executed on the left heel.

To face in marching and advance, turn on the ball of the foot in advance and step off with the other foot in the new line of direction; to face in marching without gaining ground in the new direction, turn on the ball of the foot in advance and mark time.



Pl. 1, Par. 49.

53. To the rear: 1. ***About,*** 2. ***FACE.***

Raise slightly the left heel and right toe, face to the rear, turning to the right on the right heel and the ball of the left foot; replace the left foot beside the right.

Officers execute the about face as follows:

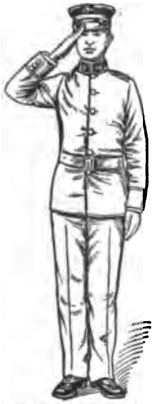
At the command ***about,*** carry the toe of the right foot about 8 inches to the rear and 3 inches to the left of the left heel without changing the position of the left foot.

At the command ***face,*** turn upon the left heel and right toe, face to the rear, and replace the right heel by the side of the left.

Enlisted men out of ranks may use the about face prescribed for officers.

Salute with the Hand.

54. 1. ***Right (left) hand,*** 2. ***SALUTE.***
Raise the right hand smartly till the tip of the forefinger touches the lower part of the headdress above the right eye, thumb and fingers extended and joined, palm to the left, forearm inclined at about 45°, hand and wrist straight; at the same time look toward the person to be saluted. ***TWO.*** Drop the arm smartly by the side.

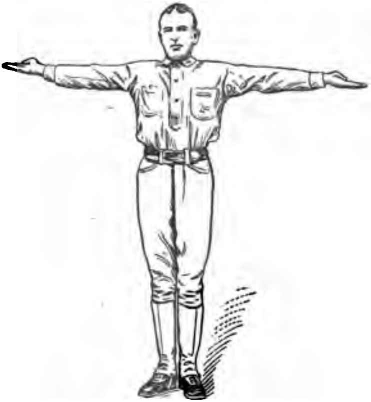

Pl. 2, par. 54.

If uncovered, the forefinger touches the forehead above the eye.

The salute for officers is the same; the left hand is used only when the right is engaged.

55. Enlisted men salute with the hand farthest from the officer, giving salute 6 yards before passing the officer, and holding the hand at the visor until the salute is acknowledged or the officer passed.

Setting-up Exercises.


Pl. 3, par. 56, 1 Ex.

56. All soldiers are regularly practiced in the following exercises, which may be supplemented by those authorized in calisthenic manuals.

The instructor places the men about 2 yards apart.

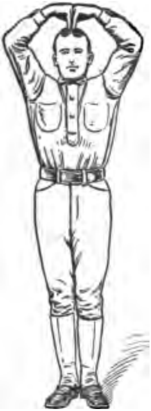
In these exercises the blouses should be unbuttoned and the cap removed.

As soon as the exercises are well understood they may be continued without repeating the commands. For this purpose the instructor gives the commands as prescribed, then adds: ***Continue the exercise,*** upon which the motions to be repeated are continuously executed until the command ***halt.***

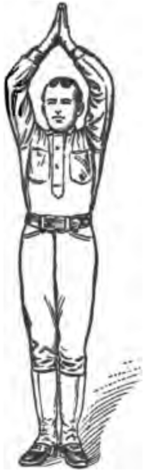
At the command ***halt,*** given at any time, the position of the soldier is resumed.

1. ***Arm,*** 2. ***EXERCISE,*** 3. ***HEAD,*** 4. ***UP,*** 5. ***DOWN,*** 6. ***RAISE.***

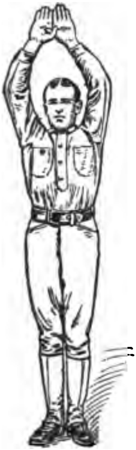
At the command ***exercise,*** raise the arms laterally until horizontal, palms upward. ***HEAD:*** Raise the arms in a circular direction over the head, tips of the fingers touching top of head, backs of fingers in contact their full length, thumbs pointing to the rear, elbows pressed back. ***UP:*** Extend the arms upward their full length, palms touching. ***DOWN:*** Force the arms obliquely back and gradually let them fall by the sides. ***RAISE:*** Raise the arms laterally as prescribed for the second command. Continue by repeating ***head, up, down, raise.***



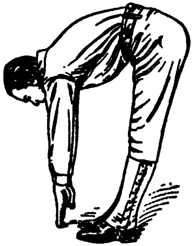
Pl. 4, par. 56, 1 Ex.



Pl. 5, par. 56, 1 Ex.



Pl. 6, par. 56, 2 Ex.

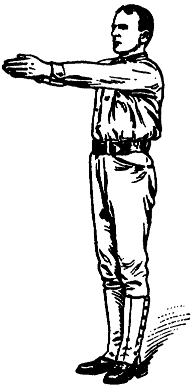


Pl. 7, Par. 56, 2 Ex.

Second Exercise.

1. ***Arms vertical, palms to the front,*** 2. ***RAISE,*** 3. ***DOWN,*** 4. ***UP.***

At the command ***raise,*** raise the arms laterally from the sides, extended to their full length, till the hands meet above the head, palms to the front, fingers pointing upward, thumbs locked, right thumb in front shoulders pressed back. ***DOWN:*** Bend over till the hands, if possible, touch the ground, keeping the arms and knees straight. ***UP:*** Straighten the body and swing the extended arms (thumbs locked) to the vertical position. Continue by repeating ***down, up.***



Pl. 8, Par. 56, 3 Ex.

Third Exercise.

1. ***Arm,*** 2. ***EXERCISE,*** 3. ***FRONT,*** 4. ***REAR.***

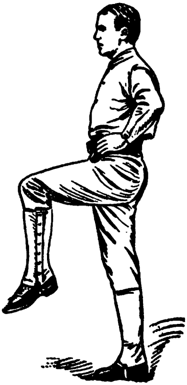
At the command ***exercise,*** raise the arms laterally until horiozntal, palms upward. ***FRONT:*** Swing the extended arms horizontally to the front, palms touching. ***REAR:*** Swing the extended arms well to the rear, inclining them slightly downward, raising the body upon the toes. Continue by repeating ***front, rear,*** till men, if possible, are able to touch the backs of the hands behind the back.

Fourth Exercise.

1. ***Leg,*** 2. ***EXERCISE,*** 3. ***UP.***

At the command ***exercise,*** place the palms of the hands on the hips, fingers to the front, thumbs to the rear, elbows pressed back. ***UP:*** Raise the left leg to the front, bending and elevating the knee as much as possible, leg from the knee to the instep vertical, toe depressed. ***UP:*** Replace the left foot and raise the right leg as prescribed for the left.

Execute slowly at first, then gradually increase to the cadence of double time. Continue by repeating ***up*** when the right and left legs are alternately in position.



Pl. 9, Par. 56, 4 Ex.

Fifth Exercise.

1. ***Leg,*** 2. ***EXERCISE,*** 3. ***Left (Right),*** 4. ***FORWARD,*** 5. ***REAR;*** or, 5. ***GROUND.***

At the command ***exercise,*** place the hands on the hips, as in the fourth exercise. ***FORWARD:*** Move the left leg to the front, knee straight, so as to advance the foot about 15 inches, toe turned out, sole nearly horizontal, body balanced on right foot. ***REAR:*** Move the leg to the rear, knee straight, toe on a line with the right heel, sole nearly horizontal. Continue by repeating ***forward, rear.***

When the recruit has learned to balance himself, the command ***forward*** is followed by ***GROUND:*** Throw the weight of the body forward by rising on the ball of the right foot, advance and plant the left, left heel 30 inches from the right, and advance the right leg quickly to the position of ***forward.*** Continue by repeating ***ground*** when the right and left legs are alternately in the position of ***forward.***

Sixth Exercise.

1. ***Lung,*** 2. ***EXERCISE,*** 3. ***INHALE,*** 4. ***EXHALE.***

At the command ***exercise,*** place the hands on the hips as in fourth exercise. ***INHALE:*** Inflate the lungs to full capacity by short, successive inhalations through the nose. ***EXHALE:*** Empty the lungs by a continuous exhalation through the mouth. Continue by repeating ***inhale, exhale.***

Seventh Exercise.

1. ***Trunk,*** 2. ***EXERCISE,*** 3. ***Circle right (or left).*** At the command ***exercise,*** raise the hands and place them on the hips, fingers to the front, thumbs to the rear, elbows pressed back. ***Circle right,*** bend the trunk to the right; turn the trunk to the rear and bend to the rear; turn the trunk to the left and bend to the left; turn the trunk to the front and bend forward. Continue by repeating ***Circle right.***

STEPS AND MARCHINGS.

Quick Time.

57. The length of the full step in quick time is 30 inches, measured from heel to heel, and the cadence is at the rate of 120 steps per minute.

58. To march in quick time: 1. ***Forward,*** 2. ***MARCH.***

At the command ***forward,*** throw the weight of the body upon the right leg, left knee straight.

At the command *march,* move the left foot smartly, but without jerk, straight forward 30 inches from the right, measuring from heel to heel, sole near the ground; straighten and turn the knee slightly out; at the same time throw the weight of the body forward and plant the foot without shock, weight of body resting upon it; next, in like manner, advance the right foot and plant it as above; continue the march.

The cadence is at first given slowly, and gradually increased to that of quick time.

The arms hang naturally, the hands moving about 6 inches to the front and 3 inches to the rear of the seam of the trousers.

59. The instructor, when necessary, indicates the cadence of the step by calling *one, two, three, four;* or, *left, right,* the instant the left and right foot, respectively, should be planted.

This rule is general.

Double Time.

60. The length of the full step in double time is 36 inches; the cadence is at the rate of 180 steps per minute.

61. To march in double time: 1. *Forward,* 2. *Double time,* 3. *MARCH.*

At the command *forward,* throw the weight of the body on the right leg.

At the command *march,* raise the hands until the forearms are horizontal, fingers closed, nails toward the body, elbows to the rear; carry forward the left foot, knee slightly bent and somewhat raised, and plant the foot 36 inches from the right; then execute the same motion with the right foot; continue this alternate movement of the feet, throwing the weight of the body forward and allowing a natural swinging motion of the arms.

If marching in quick time, the command *forward* is omitted. At the command *march,* given as either foot strikes the ground, take one step in quick, and then step off in double time.

To resume the quick time: 1. *Quick time,* 2. *MARCH.*

At the command *march,* given as either foot strikes the ground, advance and plant the other foot in double time, resume the quick time, dropping the hands by the sides.

Recruits are also exercised in running, the principles being the same as for double time.

When marching in double time and in running, the men breathe as much as possible through the nose, keeping the mouth closed.

Distances of 100, and 180 yards, are marked on the drill ground, and noncommissioned officers and men practiced in keeping correct cadence and length of pace in both quick and double time.

62. To arrest the march in quick or double time: 1. ***Squad,*** 2. ***HALT.***

At the command ***halt,*** given as either foot strikes the ground, advance and plant the other foot; place the foot in rear by the side of the other. If in double time drop the hands by the sides.

The halt, while ***marking time,*** and marching at the ***half step, side step,*** and ***back step,*** is executed by the same commands.

This rule is general, the command ***section, platoon, company,*** etc., being substituted for ***squad.***

To Mark Time.

63. Being in march: 1. ***Mark time,*** 2. ***MARCH.***

At the command ***march,*** given as either foot strikes the ground, advance and plant the other foot; bring up the foot in rear, and continue the cadence by alternately raising and planting each foot on line with the other. The feet are raised about 4 inches from the ground and planted with the same energy as when advancing.

To resume the full step: 1. ***Full step,*** 2. ***MARCH.***

Half Step.

64. Being in march: 1. ***Half step,*** 2. ***MARCH.***

At the command ***march,*** given as either foot strikes the ground, take steps of 15 inches.

To resume the full step: 1. ***Full step,*** 2. ***MARCH.***

The length of the half step in double time is 18 inches.

Side Step.

65. Being at a halt: 1. ***Right (Left) step,*** 2. ***MARCH.***

Carry and plant the right foot 10 inches to the right; bring the left foot beside it and continue the movement in cadence quick time.

The side step is used for small intervals only, and is not executed in double time.

Back Step.

66. Being at a halt: 1. ***Backward,*** 2. ***MARCH.***

At the command ***march,*** step back with the left foot 15 inches straight to the rear, then with the right, and so on, the feet alternating.

At the command ***halt,*** bring back the foot in front to the side of the one in rear.

The back step is used for short distances only, and is not executed in double time.

To March by the Flank.

67. Being in march: 1. ***By the right (left) flank,*** 2. ***MARCH.***

At the command ***march,*** given as the right foot strikes the ground, advance and plant the left foot, then face to the right in marching and step off in the new direction with the right foot.

To March to the Rear.

68. Being in march: 1. ***To the rear,*** 2. ***MARCH.***

At the command ***march,*** given as the right foot strikes the ground, advance and plant the left foot; then turning on the balls of both feet, face to the right about and immediately step off with the left foot.

If marching in double time, turn to the right about, taking four steps in place, keeping the cadence, and then step off with the left foot.

Change Step.

69. Being in march: 1. ***Change step,*** 2. ***MARCH.***

At the command ***march,*** given as the right foot strikes the ground, advance and plant the left foot; plant the toe of the right foot near the heel of the left and step off with the left foot.

The change on the right foot is similarly executed, the command march being given as the left foot strikes the ground.

Covering and Marching on Points.

70. The instructor indicates two points and requires the recruits, in succession, to place themselves upon the prolongation of the straight line through these points and then to march upon them in both quick and double time.

It should be demonstrated to the recruits that they can not march in a straight line without selecting two points in the desired direction and keeping them covered while advancing.

A distant and conspicuous landmark is next selected as a point of direction. The recruit is required to choose two intermediate points in line with the point of direction and to march upon it by covering these points, new points being selected as he advances.

SECTION III.—*The squad.*

71. As soon as the recruits are sufficiently instructed for the purpose, they are formed into squads of convenient size in order to teach them the principles of the alignments, taking intervals, and the marchings.

72. For this instruction, the recruits are formed in double rank. The files on the right and left of the squad are always complete; if there be an incomplete file, it will be the second from the left. The rear-rank men cover their file leaders accurately at 1 yard distance.

In the case of a small number of recruits, they may be formed in single rank. The movements described for the double rank formation apply equally well to the single rank, omitting the explanations for the rear-rank men.

To Form the Squad.

73. To form the squad, the instructor designates a recruit as the front-rank man of the right file and indicates to him where the right of the squad is to rest; he then places himself about 3 yards in front of where the center is to be formed, and commands: ***FALL IN.***

The men form on the designated recruit, in two ranks facing to the front, as already prescribed. (Par. 47.)

74. The squad executes ***the rests;*** resumes ***the attention*** ***marks time;*** and executes ***the facings,*** the ***setting-up exercise***

the steps, and ***the halt,*** and is dismissed by the same commands and means as explained for the recruit.

Alignments.

75. The alignments are first taught by requiring the recruits to align themselves upon two files established as a base.

Being at a halt, the instructor causes the first two files on the flank toward which the alignment is to be made to move forward a few paces, and establishes them as a base; he then commands: 1. ***Right (left),*** 2. ***DRESS,*** 3. ***FRONT.***

At the command ***dress*** the first two files turn their heads to the right so as to bring the left eye in a line about 2 inches to the right of the center of the body. Eyes fixed on the line of eyes of the men in or supposed to be in the same rank. The remaining files march to the front, each man shortening the last step so as to place himself about 6 inches in rear of the new alignment, which must never be passed; each man then looks to the right, as previously prescribed for the first two files, and, taking steps of 2 or 3 inches, moves up, slightly opening out his right elbow and touching the left elbow of the man on his right, bringing his eyes and shoulders in line with those of the men in rank on his right, then withdraws his elbow from touch, but keeps his eyes to the right. In dressing to the left, intervals are taken in a similar manner, by making a light touch with the left elbow to the right elbow of the next man on the left. At the command ***front,*** given when the ranks are aligned, the men cast their eyes to the front. All movement in ranks must then cease.

76. At first, the basis of the alignment is established parallel to the front of the squad; afterwards, in oblique directions.

77. The recruits having learned to align themselves, the instructor establishes the base file and commands: 1. ***Right (left),*** 2. ***DRESS,*** 3. ***FRONT.***

At the command ***dress,*** the men, except the base file, move forward and all dress as previously explained, the rear-rank men being careful to cover their file leaders accurately.

78. Alignments to the rear are executed on the same principles: 1. ***Right (left) backward,*** 2. ***DRESS,*** 3. ***FRONT.***

The men step back, halt a little in rear of the line, and immediately dress up as previously explained.

79. To execute the alignments, using the side step, the instructor establishes the base file a short distance to the right or left of the squad, and commands: 1. *Right (left) step,* 2. *(Right or left),* 3. *DRESS,* 4. *FRONT.*

At the command *dress,* the men execute the side step, close toward the base file, and dress as previously explained.

To Take Intervals.

80. Being in line at a halt: 1. *To the right (left) take intervals,* 2. *MARCH,* 3. *Squad,* 4. *HALT.*

At the first command, the rear rank steps back to 2 yards distance from the front rank; at the command *march,* all face to the right and the leading man of each rank steps off; the other men step off in succession so as to follow the preceding man at 2 yards.

At the command *halt,* given when all have their intervals, all halt and face to the front.

To Assemble.

81. 1. *To the right (left) assemble,* 2. *MARCH.*

The front-rank man on the right stands fast, the rear-rank man on the right closes to 1 yard. The other men face to the right, close by the shortest line, and face to the front.

Marchings.

82. During the marchings the guide conducts the march, preserving with great care the direction, length, and cadence of the step, selecting points on which to march, as explained in paragraph 70.

To March to the front.

83. Being at a halt: 1. *Forward,* 2. *MARCH.*

The men step off and march straight to the front.

If in line, the rear-rank men follow their file leaders accurately. The instructor sees that the ranks preserve the alignment and the intervals toward the side of the guide. The me yield to pressure from that side and resist pressure from tl opposite side; by slightly shortening or lengthening the step they gradually recover the alignment, and by slightly opening out or closing in they gradually recover the interval, if lost; while habitually keeping the head to the front, they may occasionally glance toward the side of the guide to assure themselves of the alignment and interval, but the head is turned as little as possible for this purpose.

If in flank column, the men of the leading file step off at full step; the leading rear-rank man marches abreast of his file leader at 26 inches interval. The other files march at the half step, each taking the full step when at 1 yard distance.

84. Being in march: 1. *To the rear,* 2. ***MARCH.***

Executed as explained in paragraph 68.

If at a halt, the squad may be faced about and then moved forward, as explained in the preceding paragraph; or, without facing about, it may be marched a short distance to the rear, as explained in paragraph 66, by the command: 1. *Backward,* 2. ***MARCH.***

Whenever the squad in line is faced about or marched to the rear, all men in the front rank not covered step into the new front rank.

To March by the Flank.

85. Being in line: 1. *By the right (left) flank,* 2. ***MARCH.***

Executed as explained in paragraphs 67 and 83.

The formation obtained by marching by the flank from line is called a *flank column.*

If at a halt, the squad may be marched by the flank by first facing it in the desired direction and then moving it forward, as explained in paragraph 83.

When the march by the flank is executed from flank column while at 1 yard distance, the file close in gradually toward the guide until they have the prescribed interval.

86. Whenever the flank column is halted while marching at 1 yard distance, the leading file halts at the command; the others close to facing distance before halting.

87. To close up in flank column without halting: 1. *Close,* 2. ***MARCH.***

The leading file takes the half step; the other files close to facing distance and take the half step; all the files having closed to facing distance, the column is halted or marched by the flank as previously explained.

88. To halt the flank column without closing up: 1. ***In place,*** 2. ***HALT.***

To March Obliquely.

89. For the instruction of recruits, the squad being correctly aligned, the instructor causes the squad to face half right or half left, points out to the men their relative positions, and explains that these are to be maintained in the oblique march.

90. 1. ***Right (left) oblique,*** 2. ***MARCH.***

Each man steps off in a direction 45° to the right of his former front. He preserves his relative position, keeping his shoulders parallel to those of the guide, and so regulates his step as to keep the ranks parallel to their original direction.

If the command ***halt*** be given while marching obliquely, the men halt faced to the original front.

To resume the original direction: 1. ***Forward,*** 2. ***MARCH,*** 3. ***Guide (right or left)***

At ***half step*** or ***mark time,*** while obliquing, the oblique march is resumed by the commands: 1. ***Full step,*** 2. ***MARCH.***

91. After obliquing, if line be formed, the files, if not at proper intervals, close in gradually toward the guide; similarly, if flank column be formed, the files, if not at 1 yard distance, fall back as prescribed in paragraph 83.

To Change Direction in Flank Column.

92. 1. ***Column right (left),*** 2. ***MARCH.***

The pivot man of the leading file faces to the right in marching and takes the half step; the man on the marching flank, by twice obliquing to the right, places himself abreast of the pivot man; the latter then takes the full step. The other files march squarely up to the turning point and execute the change of direction on the same ground and in the same manner. When executed from a halt, all the men step off at the command ***march.***

93. The exercise of a ***section dismounted*** are similarly executed, substituting in the latter case the word section for squad in the commands.

SECTION IV.—*Manual of the pistol.*

94. The instruction under this head is first given on foot.

95. The pistol being in the holster, to raise pistol: 1. ***Raise,*** 2. ***PISTOL.***

At the command ***raise,*** unbutton the holster flap with the right hand and grasp the stock, back of the hand to the body.

At the command ***pistol,*** draw the pistol from the holster, reverse it, muzzle up, the hand holding the stock with the thumb and last three fingers; the little finger may be placed under the butt; forefinger outside of the guard; guard to the front; barrel nearly vertical; hand as high as the neck and 6 inches to the right and front of the right shoulder. This is the position of ***raise pistol.***

96. Being mounted and at position ***raise pistol,*** 1. ***Lower,*** 2. ***PISTOL.*** At the command ***pistol,*** lower the pistol, without changing the grasp, rest the hand and pistol on the right thigh, back of hand up, muzzle in front of right knee.

97. Being at raise or lower pistol: 1. ***Return,*** 2. ***PISTOL.***

Insert the pistol in the holster, back of hand to the body, button the flap, and drop the hand by the side.

If the holster is so constructed that the butt is to the rear, raise and return pistol are executed as already prescribed, except that the back of the hand is to the right and the pistol is not reversed.

98. 1. ***Inspection,*** 2. ***PISTOL.***

Execute raise pistol, except that the pistol is held about 6 inches in front of the center of the body, barrel up, pointing to the left front and upward at an angle of about 45°, wrist straight and as high as the breast.

The instructor passes along the rank and examines the pistols. To inspect the pistol minutely, he takes it in his hands and then returns it to the soldier, who grasps it at the stock and resumes ***inspection pistol;*** each man returns pistol as the inspector passes to the next. If the pistols are not inspected, they are returned by the commands: 1. ***Return,*** 2. ***PISTOL.***

For purposes of instruction the men may be required to execute ***inspection pistol*** simultaneously, suitable caution being given to that effect by the instructor. But at formal inspections the men execute ***inspection pistol*** in succession as the inspector approaches them.

99. Being at raise or lower pistol: ***LOAD.***

Place the pistol at the cylinder in the left hand, latch up, barrel inclined to the left front and downward at an angle of about 30°; draw back the latch with the right thumb, push the cylinder out with the second finger of the left hand, and, if necessary, eject the empty shells by pressing the ejector with the left thumb, right hand steadying the pistol at the stock; take a cartridge from the belt or box, insert it in the chamber, press it home with the right thumb, and so on for each chamber to be loaded; close the cylinder with the left thumb so that the hammer will rest over the empty chamber and resume position held before loading.

Firings.

100. For single action. Being at raise (or lower) pistol: 1. ***To the front (right oblique, etc.);*** or, 1. ***At*** (such an object), 2. ***READY.***

Cock the pistol with the right thumb and direct the eyes to the front or toward the target.

101. 1. ***Squad,*** 2. ***FIRE.***

Thrust and point the pistol to the front or toward the target, arm nearly or quite extended, keeping the eyes on the object, and fire; resume the raise (or lower) pistol.

To continue the firing in the same direction, or at the same target: 1. ***READY,*** 2. ***Squad,*** 3. ***FIRE.***

102. For double action, being at raise (or lower) pistol: 1. ***To the front (right oblique, etc.),*** 2. ***Squad,*** 3. ***FIRE;*** or, 1. ***At*** (such an object), 2. ***Squad,*** 3. ***FIRE.***

Executed as in paragraph 103, except that at the command Fire the pistol is cocked by pressing steadily on the trigger.

103. An almost imperceptible pause may be allowed between the thrusting and firing, in which to correctly point the pistol. Deliberate aiming, however, should not be encouraged. After firing without cartridges, pause an instant to see if the pistol is correctly pointed, to get the personal error.

The instructor must take into account individual peculiarities in order to secure the best results in firing; in such cases departure from the text is permissible.

When mounted, lean slightly forward, bearing on the stirrups; in firing to the front, lean well to the right and slightly forward, to avoid burning or frightening the horse.

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104. In a similar manner the men will be instructed to fire to the left, right, right oblique, left oblique, right rear, left rear, and rear. When firing to the left, the pistol hand will be about opposite the left shoulder; when firing to the rear or right rear, the shoulders are turned about 45° to the right; when firing to the left and left rear, the shoulders are turned about 45° to the left.

105. The recruits are first taught the motions of loading and firing without using cartridges. Loading and pointing practice shall be given mounted, at all gaits.

106. No cartridges will be used, except when indicated in the first command, thus: 1. ***With*** (so many) ***Dummy (blank*** or ***ball) cartridges,*** 2. ***LOAD.***

To Fire at Will.

107. 1. ***Fire at will,*** 2. ***To the front, etc.,*** or, 2. ***At*** (such an object), 3. ***COMMENCE FIRING,*** 4. ***CEASE FIRING.***

The man fires as rapidly as is consistent with good pointing at each shot. The raise or lower pistol is resumed after each shot.

108. At the command ***cease firing,*** the firing will stop, and the men resume the ***raise*** or ***lower pistol.***

Target practice will be conducted on the principles explained in the Small-Arms Firing Regulations.

CHAPTER III.—THE COMPANY DISMOUNTED.

SECTION I.—*General provisions.*

109. The instruction herein prescribed for the field company dismounted is applicable, with obvious modifications, to the platoon dismounted and the section dismounted. Other companies of the Signal Corps, not mounted, will be governed by the Infantry Drill Regulations.

110. Sections are either wire sections or wireless sections.

A wire section dismounted comprises all the men assigned to the installation and maintenance of a wire line of information. It consists of one first-class sergeant, who is chief of section, one sergeant, two corporals, driver, operators, linemen, messengers, and horse holders

A wireless section dismounted comprises all the men assigned to the establishment and maintenance of a wireless station. A pack wireless section consists of one first-class sergeant, who is chief of section, one sergeant, two corporals, operators, antenna men, messengers, and horse holders. A wagon wireless section consists of one first-class sergeant, who is chief of section, one sergeant, two corporals, the engineer, the wagoner, operators, antenna men, guy men, messengers, and horse holders.

The men are permanently assigned to sections and are transferred by order of the captain only; they may be temporarily attached to sections not their own to equalize subdivisions at drill or other duty.

111. ***A platoon dismounted*** consists of one lieutenant, who is chief of platoon, and two sections dismounted.

112. ***A company dismounted*** comprises three platoons and such additional men as are necessary for administrative, tactical, and technical purposes.

113. Chief of platoons and of sections supervise the movements of their platoons and sections, but repeat or give commands only when prescribed.

114. File closers will rectify mistakes and insure steadiness and promptness in the ranks.

115. The company is formed in double rank, with the platoons and sections arranged from right to left in the order of their permanent numbers.

The senior lieutenant is assigned as chief of the first platoon, the lieutenant next in rank as chief of the second platoon, and so on.

The first four sections of a field company are wire sections; the other two are pack wireless sections.

The first four sections in a field wireless company are pack wireless sections; the other two are wagon wireless sections.

SECTION II.—*Posts of officers, noncommissioned officers, etc., in line.*

116. ***The captain:*** Four yards in front of the center of the company. ***Chiefs of platoons:*** Two yards in front of the center of their platoons. ***Master signal electricians:*** In the line of file closers, opposite the centers of the first and third platoons, respectively. ***First sergeant:*** In the front rank, 1 yard from right of the guidon. ***Chiefs of sections:*** One yard in front of the center of their sections. ***Sergeants:*** In the front rank on the right of their sections, not covered in the rear rank. ***Supply, stable, and mess sergeants:*** In the line of file closers. ***Corporals:*** In the front rank of their sections, one on the left of the sergeant, the other on the left of the section. ***Guidon:*** On the right of the front rank of the first section, not covered in the rear rank. ***Trumpeters:*** In the line of file closers, in rear of the first section. Mechanics, cooks, etc., when present, will be assigned to the various sections.

117. In flank columns the posts are the same as when faced with the company from line.

SECTION III.—*To form the company dismounted.*

118. At the sounding of the assembly, the first sergeant, facing the company, and 6 yards in front of where the center is to be, commands: 1. ***Fall in,*** 2. ***Call rolls,*** 3. ***REPORT.***

At the command ***fall in,*** the sergeants place themselves on the line facing to the front, in their proper order, at sufficient distance apart for the formation of their sections. The men of each section fall in on the left of their sergeants, as prescribed in paragraph 73; the chiefs of sections take their posts, facing their sections, and the guidon and the file closers, except the master signal electricians, take their posts. The assembly havin ceased, the first sergeant causes the sections to close to the right, if necessary.

At the command ***call rolls,*** the chief of sections call the rolls and then face to the front.

At the command ***report,*** the chief of the first section salutes and reports, "***First section present,***" or "***First section, Corporal ——— and Private ——— are absent.***" The first sergeant, having received and verified the report, returns the salute with the right hand. The chief of the second section then reports in like manner, and so on. Men who are known to be absent by proper authority are not reported absent by the chiefs of section. After receiving the reports the first sergeant faces about, salutes the captain and reports, "***Sir, the company is present*** or ***accounted for,***" or "***Sir,*** (so many) ***noncommissioned officers*** or ***privates are absent.***" The first sergeant then takes his post. The captain places himself about 12 yards in front of the center of the company, superintends the formation, and receives the report of the first sergeant, whose salute he returns. The lieutenants and master signal electricians take their posts as soon as the first sergeant has reported. During instruction the officers have the saber drawn or in the scabbard, at the discretion of the captain. When the captain draws saber the lieutenants also will draw sabers.

Alignments.

119. The alignments are executed as prescribed for the squad, the guide being established instead of the base file. In aligning the company, the captain places himself in prolongation of the line, 2 yards from and facing the flank toward which the alignment is made; after commanding ***FRONT*** he resumes his post.

To Dismiss the Company.

120. Being in line at a halt the captain directs the first sergeant: ***Dismiss the company,*** and returns the salute of the first sergeant.

The officers and master signal electricians fall out; the first sergeant salutes, steps 3 yards to the front, faces to the left, and commands: ***DISMISSED.***

In exceptional cases the company may be dismissed from any formation, either at a halt or marching.

Route Order and at Ease.

121. Marching in flank column: 1. ***ROUTE ORDER,*** or, 1. ***AT EASE.***

The officers carry their sabers at will or in the scabbard; the men retain their positions in ranks, but are not required to keep step.

If the command be ***route order,*** the men are permitted to talk; if the command be ***at ease,*** silence is preserved.

To resume the cadenced step: 1. ***Company,*** 2. ***ATTENTION.***

If halted, while marching at route order, the men remain at rest in ranks; if halted while marching at ease, they remain at ease.

Route order and at ease are not used while marching in double time.

PART III.

MOUNTED INSTRUCTION.

CHAPTER I.—THE SOLDIER MOUNTED.

122. The object of this instruction is to teach horsemanship to the extent necessary to enable detachments and companies of the Signal Corps to efficiently perform the mounted duties required of them.

123. During the first few lessons the instructor will devote his attention chiefly to giving the recruits the proper seat and carriage and to making them self-confident on horseback; he quietly and patiently corrects the faults of each individual as they occur, frequently passing from one to another, and will require by degrees the correct execution of his teachings; these understood and confidence imparted, the positions and motions will be rigidly enforced.

The recruit will be taught that his own disposition or temper is usually communicated to and reacts upon the horse, and therefore it is to their mutual interest to preserve calmness.

The instructor may dismount when he can, in that way the better teach the positions.

Quiet, well-trained horses are first assigned.

124. Each mounted drill begins and ends at the walk. ***This rule is general.***

125. During the drills the recruits are taught the following rules for the care of horses, until the instructor is satisfied by means of questions that they are thoroughly comprehended:

Never threaten, strike, or otherwise abuse a horse.

Before entering a stall or when approaching a horse from the rear speak to the horse gently.

Never take a rapid gait until the horse has been warmed up by gentle exercise.

Never put up a horse brought in a heated condition to the stable or picket line, but throw a blanket over him and rub his legs, or walk him until cool. When he is wet, put him under shelter, and rub him until dry.

Never feed grain to a horse nor allow him to stand uncovered when heated. Hay will not hurt a horse no matter how warm he may be.

Never water a horse when heated unless the exercise or march is to be immediately resumed.

Never throw water over any part of a horse when heated.

Never allow a horse's back to be cooled suddenly by washing or even removing the blanket unnecessarily.

To cool the back gradually, the blanket may be removed and replaced with the dry side next the horse.

The Equipment of the Horse.

126. The instructor indicates the different parts and uses of each equipment as a commencement of this instruction.

To Fold the Saddle Blanket.

127. The blanket, after being well shaken, will be folded into six thicknesses, as follows: Hold it well up by the two corners, the long way up and down; double it lengthwise (so the fold will come between the "U" and "S"), the folded corner (middle of blanket) in the left hand; take the folded corner between the thumb and forefinger of the right hand; thumb pointing to the left; slip the left hand down the folded edge two-thirds its length and seize it with the thumb and second finger; raise the hands to the height of the shoulders, the blanket between them extended; bring the hands together, the double fold falling outward; pass the folded corner from the right hand into the left hand, between the thumb and forefinger, slip the second finger of the right hand between the folds, and seize the double-folded corner; turn the left (disengaged) corner in, and seize it with thumb and forefinger of the right hand, the second finger of the right hand stretching and evening the folds; after evening the folds, grasp the corners and shake the blanket well in order to smooth the folds, raise the blanket, and place it between the chin and breast; slip the hands down halfway, the first two fingers outside, the other fingers and thumb of each hand inside, seize the blanket with the thumb and first two fingers, let the part under the chin fall forwar hold the blanket up, arms extended, even the lower edges, seize the middle points between the thumbs and forefingers, and flirt the outside part over the right arm; the blanket is thus held before placing it on the horse.

To put on the Blanket and Surcingle.

128. The instructor commands: ***BLANKET.*** Approach the horse on the near (left) side, with the blanket folded and held as just described; place it well forward on his back, by tossing the part of the blanket over the right arm to the off (right) side of the horse, still keeping hold of the middle points; slide the blanket once or twice from front to rear to smooth the hair, being careful to raise the blanket in bringing it forward; place the blanket with the forefinger of the left hand on the withers, and the forefinger of the right hand on the backbone, the blanket smooth; it should then be well forward with the edges on the left side; remove the locks of mane that may be under it; pass the buckle end of the surcingle over the middle of the blanket, and buckle it on the near side, a little below the edge of the blanket.

To put on the Watering Bridle.

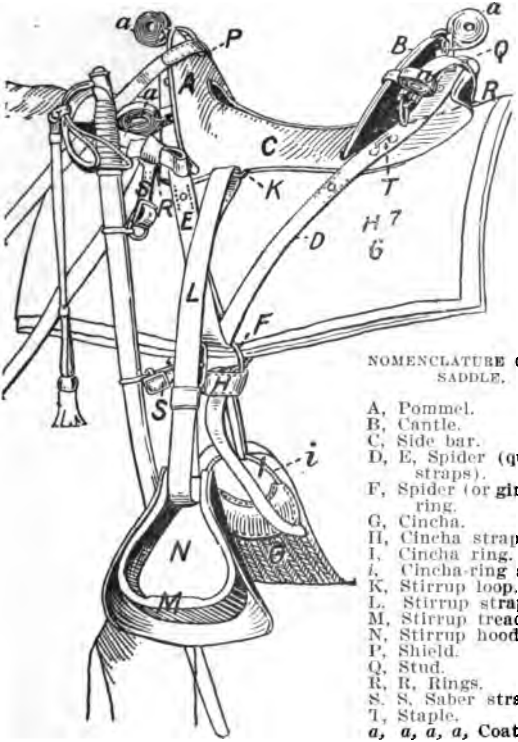
129. The instructor commands: ***BRIDLE.*** Take the reins in the right hand, the bit in the left; approach the horse on the near side, slip the reins over the horse's head and let them rest on his neck; reach under and engage the snap in the right halter ring, insert the left thumb in the side of the horse's mouth above the tush and press open the lower jaw; insert the bit and engage the snap in the left halter ring. The bit should hang so as to touch, but not draw up, the corners of the mouth.

To Unbridle.

130. At the command *unbriddle,* pass the reins over the horse's head, disengage the snaps, and remove the bit gently from the horse's mouth.

THE SOLDIER MOUNTED.

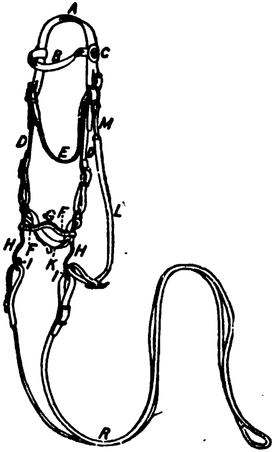
131. *The Saddle and Bridle.*



NOMENCLATURE OF THE SADDLE.

A, Pommel.
B, Cantle.
C, Side bar.
D, E, Spider (quarter straps).
F, Spider (or girth-strap) ring.
G, Cincha.
H, Cincha strap.
I, Cincha ring.
i, Cincha-ring safe.
K, Stirrup loop.
L. Stirrup strap.
M, Stirrup tread.
N, Stirrup hood.
P, Shield.
Q, Stud.
R, R, Rings.
S. S. Saber straps.
T, Staple.
a, a, a, a, Coat straps.

Pl. 10, Par. 131.



NOMENCLATURE OF THE BRIDL

Headstall:
A, Crownpiece.
B, Brow band.
C, Ornament.
D, D, Cheek piece.
E, Throatlatch.

Bit:
F, F, Mouth piece.
G, Port.
H, H, Branches.
I, I, Rein rings.
K, Curb strap.
R, Reins.

Link:
L, Link strap.
M, Link snap.

Pl. 11, Par. 131.

132. Greatest care will be taken in the fitting of the saddle; sore backs are generally occasioned by neglect, and the men must never be allowed to lounge or sit unevenly in the saddle.

To Saddle.

133. For instruction, the saddle may be placed 4 yards in rear or front of the horse. The stirrups are crossed over the seat, the right one uppermost; then the cincha and cincha strap are crossed above the stirrups, the strap uppermost. The blanket having been placed as previously explained, the instructor commands: ***SADDLE.***

Seize the pommel of the saddle with the left hand and the cantle with the right, approach the horse on the near side from the direction of the croup, and ***place the center of the saddle on the middle of the horse's back,*** the end of the side bar about three finger widths behind the point of the shoulder blade; let down the cincha strap and cincha; pass to the off side, adjust the cincha and straps, and see that the blanket is smooth; return to the near side, raise the blanket slightly under the pommel arch so that the withers may not be compressed; take the cincha strap in the right hand, reach under the horse and seize the cincha ring with the left hand, pass the end of the strap through the ring from underneath (from inside to outside), then up and through the upper ring from the outside; if necessary, make another fold in the same manner.

The strap is fastened as follows: Pass the end through the upper ring to the front; seize it with the left hand, place the fingers of the right between the outside folds of the strap; pull from the horse with the right hand and take up the slack with the left; cross the strap over the folds, pass the end of it with the right hand underneath and through the upper ring back of the folds, then down and under the loop that crosses the folds, and draw it tightly; weave the ends of the strap into the strands of the cincha.

Another method of fastening the cincha strap is as follows: Pass the end through the upper ring to the rear; seize it with the right hand, place the fingers of the left between the outer folds of the strap; pull from the horse with the left hand and take up the slack with the right; pass the end of the strap underneath and draw it through the upper ring until a loop is formed; double the loose end of the strap and push it through the loop and draw the loop taut. The free end should then be long enough to conveniently seize with the hand.

Having fastened the cincha strap, let down the right stirrup and then the left.

The surcingle, when used, is then buckled over the saddle and should be a little looser than the cincha.

The cincha, when first tied, should admit a finger between it and the belly. After exercising for awhile the cincha will be found too loose and should be tightened.

134. To approximate the length of the stirrup straps before mounting, they are adjusted so that the length of the stirrup strap, including the stirrup, is about 1 inch less than the length of the arm, fingers extended.

To Unsaddle.

135. The instructor commands: ***UNSADDLE.***

Stand on the near side of the horse; unbuckle and remov the surcingle; cross the left stirrup over the saddle; loosen th cincha strap and let down the cincha; pass to the off side, cross the right stirrup, then the cincha; pass to the near side, cross the cincha strap over the saddle; grasp the pommel with the left hand, the cantle with the right, and remove the saddle over the croup and place it in front or rear of the horse, as may be directed, pommel to the front; grasp the blanket at the withers with the left hand and at the loin with the right, remove it in the direction of the croup, the edges falling together, wet side in, and place it across the saddle, folded edge on the pommel.

If in the stable, place the saddle on its peg when taken off the horse.

To Put on the Curb Bridle.

136. The instructor commands: ***BRIDLE.***

Take the reins in the right, the crown piece in the left hand; approach the horse on the near side, passing the right hand along his neck; slip the reins over his head and let them rest on his neck; take the crownpiece in the right hand and the lower left branch of the bit in the left hand, the fore finger against the mouthpiece; bring the crownpiece in front of and slightly below its proper position; insert the thumb into the side of the mouth above the tush; press open the lower jaw, insert the bit by raising the crownpiece; with the left hand draw the ears gently under the crownpiece, beginning with the left ear; arrange the forelock, secure the throatlatch, and then the curb strap, taking care not to set them too closely.

137. The mouthpiece, which should fit the width of the horse's mouth, rests on that part of the bars (the lower jaw between the tushes and molars) directly opposite the chin groove; the curb strap should then lie in the chin groove without any tendency to mount up out of it on the sharp bones of the lower jaw. This position of the mouthpiece will be attained for the majority of horses by adjusting the cheek straps so that the mouthpiece will be 1 inch above the tushes of the horse and 2 inches above the corner teeth of the mare.

The throatlatch should admit four fingers between it and the throat; this prevents constriction of the windpipe or pressure on the large blood vessels.

The curb strap should fit smoothly the chin groove and be loose enough to admit one or two fingers when the branches of the bit are in line with the cheek straps.

138. At the discretion of the instructor, the halter may be taken off before bridling, the reins being first passed over the neck; the hitching strap, if not left at the manger or picket line, is tied around the horse's neck; if the horse be saddled, in the near pommel ring.

To Unbridle.

139. The instructor commands: ***UNBRIDLE.***

Stand on the near side of the horse; pass the reins over the horse's head, placing them on the bend of the left arm; unbuckle the throatlatch, grasp the crownpiece with the right, and assisting with the left hand gently disengage the ears; grasp the bit with the left hand, and gently disengage it from the horse's mouth by lowering the crownpiece; place the crownpiece in the palm of the left hand, take the reins in the right hand, pass them together over the crownpiece, make two or three turns around the bridle, then pass the bight between the brow band and crownpiece and draw it snug.

The bridle is hung up by the reins, or placed across the saddle on the blanket.

If the horse has no halter on, unbridle and push the bridle back so that the crownpiece will rest on the neck behind the poll until the halter is replaced.

To Roll the Overcoat.

140. Spread the overcoat on the ground, inside down, skirt buttoned throughout, sleeves parallel to the middle seam, collar turned over on the shoulders.

Turn the tails of the coat under about 9 inches, the folded edge perpendicular to the back seam. Fold over the sides to form a rectangle not more than 34 inches across, according to the size of the coat. Roll tightly from the collar with the hands and knees and bring over the whole roll that part of the skirt which was turned under, thus binding the roll.

The Blanket Roll for Mounted Men.

141. To make the roll: Spread the shelter half (model 1904) on the ground, roll straps underneath, and fold over the tr angular part on the rectangular part. Turn under the ro strap edge of the shelter half so that the width of the fold will be 8 inches. Fold the blanket once across the longer edges and lay the blanket on the shelter half, folded edge within 1 inch of the roll-strap edge of shelter half. Fold the sides of blanket and of shelter half inward, width of folds about 11 inches. The shelter-tent pole and pins are now laid on the blanket at the edge farthest from the roll-strap edge, pole on one side, pins on the other, thus leaving what will be the middle of the pack free to bend.

Roll tightly, using hands and knees, toward the roll-strap edge, and bring over the entire roll the part the shelter half which was turned under, thus binding the roll. Buckle the two available roll straps about the roll, passing them around twice.

The roll should be about 44 inches long and about 6 inches in diameter.

The Blanket Roll for Men not Individually Mounted.

142. To make the roll, lay the shelter half on the ground and fold over the triangular part on the rectangular part.

Fold the blanket in six thicknesses, as prescribed in the Drill Regulations for folding the saddle blanket, except that the first fold is made across the length of the blanket instead of across its width.

Lay the folded blanket on the shelter half, so that one of its shorter sides will be about 8 inches from the edge of the shelter half farthest from the triangular part. Across the other short side of the blanket place the shelter-tent pole and pins. Fold over the sides and ends of the shelter half which lie outside of the blanket, causing the ropes and straps to be included within the folds.

Commencing at the end where the pole and pins were placed, roll the pack, using the hands and knees to insure the roll being made as tight as possible. Just before the roll is completed, open out slightly with the hands the pocket formed by the 8-inch fold of the shelter half, and then draw the pocket over the roll, thus binding it. Be particularly careful to draw the canvas over the ends of the roll so as to prevent rain from entering the inner portions of the roll. The roll should be about 22 inches long and about 7 inches in diameter.

To Pack the Saddle.

143. Overcoat rolled as prescribed, and strapped on pommel; saddlebags attached to rear of saddle, by saddlebag stud and staples, and to cincha rings by saddlebag straps; blanket and shelter half rolled as prescribed and strapped to cantle with one short strap and to the saddlebag rings with two long (60-inch) straps; nose bag drawn up under near saddlebag, the ventilating piece outward and just concealed by the bottom of the saddlebag, the nose-bag strap passed through the near cantle rings, with a turn around the ring to prevent slipping, and then buckled; canteen snapped to off cantle ring; meat can, tin cup, knife, fork, spoon, two haversack rations in near pocket of saddlebag; currycomb, brush, watering bridle, one emergency ration, and the authorized toilet articles in off pocket of saddlebag.

The Position of Stand to Horse.

144. The instructor commands: ***STAND TO HORSE.***

Each man places himself, facing to the front, on the near side of the horse, eyes on a line with the front of the horse's head, so he can see along the front, and takes the position of the soldier, except that the right hand, nails down, grasps both reins, forefinger separating them, 6 inches from the bit.

To Lead Out.

145. The men standing to horse, to leave the stable or picket line, the instructor commands: ***LEAD OUT.***

Each man, holding his hand well up and firm, leads his horse, without looking at him, to the place designated by the instructor.

The men form in single rank from right to left, and, until further orders, with intervals of 3 yards.

If the horse shows a disposition to resist being led, the man takes the reins from the horse's neck, takes the ends in the left hand, then, with the right hand holding the reins, leads the horse as before. When leading through a low or narrow doorway the horse should be quieted by the voice or caresses, and n allowed to pass through hurriedly. To prevent the horse fr rushing ahead the instructor may direct the man to face toward the horse, holding one rein in each hand, close to the bit, and lead him by stepping backward; after passing the doorway the man leads the horse as before.

To Align the Rank.

146. 1. *Right (left),* 2. ***DRESS,*** 3. ***FRONT.***

The men dress to the right and move their horses forward or backward, as may be necessary to align them.

To Mount (without Saddle).

147. 1. *Prepare to mount,* 2. ***MOUNT.***

At the first command drop the right rein, take two back steps, stepping off with the left foot, at the same time sliding the right hand along the left rein, face to the right. This should place the man behind the near shoulder of the horse. Take both reins in the right hand, aided by the left, the reins coming in on the side of the forefinger, forefinger between the reins, the loose end falling over on the off side; place the right hand behind the withers, holding the reins short enough to feel lightly the horse's mouth; place the left hand near the withers, and grasp a lock of the mane, the lock coming out between the thumb and forefinger.

At the command *mount,* spring lightly from the ground and raise the body, keeping it erect, and supporting the weight on the hands; carry the right leg, knee bent, over the horse's back, the weight still borne on the hands; sit down gently on the horse's back, and take one rein in each hand, the reins bearing equally on the horse's mouth.

Position of the Soldier, Mounted (without Saddle).

148. Body balanced on the middle of the horse's back. Head erect and square to the front.

Chin slightly drawn in, but not so much as to produce stiffness.

Body erect, but without stiffness.

Forearms close to the sides, without pressure.

Hands about 6 inches apart, backs straight up and down and outward and held low, so that the little fingers will brush the mane on top of the withers.

The right rein in the right hand and the left rein in the left hand, coming in on the underside of the little finger and coming out over second joint of forefinger, on which the thumb firmly holds the rein; the other fingers closed on the reins, nails toward the body; reins bearing equally on the horse's mouth; bight—end—of reins falling to the front and on the right side of the horse's neck.

Buttocks bearing equally on the middle of the horse's back, the seat being as flat as possible.

Legs stretched by their weight alone; the horse clasped by the entire leg—that is, the flat of the thighs, the inside of the knees, and the calf of the leg.

Feet hanging naturally and turned out at whatever angle the conformation of the man requires in order to grasp the horse as above.

Remarks on the Position of the Soldier Mounted.

149. Body erect but without stiffness. While the head and shoulders should not droop forward, nor the chest be contracted, nor the back curved to the rear, and any tendency to slouch should be promptly corrected, still no part of the body should be held so straight or erect as to produce stiffness.

Forearms close to the sides without pressure, to prevent their being thrown out when the horse trots; if with pressure, the motion of the body will be communicated to the hand and rein.

Buttocks bearing equally, and seat as flat as possible, so that the body will preserve its steadiness.

Flat of thighs, inside of knees, and the calf of the leg clasping the horse equally to give a firm, steady seat.

The body from the hips up should be movable and should yield to the motion of the horse.

The man should have hold the horse all the time with the legs, but not grasping him so much as to produce fatigue; his legs from the inside of the thighs and knees and calf should be in constant contact with the horse, but not so much as to produce fatigue in the man. The arms should be without stiff ness at the shoulders to avoid communicating the motion of the body to the reins.

The hands take a gentle feel of the horse's mouth, but otherwise are stationary, except to direct the horse.

During the early lessons the position of the recruit is necessarily one of constraint. He will probably be much fatigued and possibly made sore in tendons and muscles. An effort should be made to teach him to ride without unnecessary fatigue or injuring him physically and without putting him to anything which will tend to destroy his confidence on a horse or his "nerve."

No man can be said to be a good horseman who has not a firm, well-balanced seat, and good hands; these are therefore of the utmost importance; they will assist the horse; the want of them will impede the horse's actions and make sore backs, etc.

To Lengthen or Shorten the Reins.

150. Bring the hands toward each other; grasp the right rein with the thumb and forefinger of the left hand a short distance from the right thumb; relax the grasp of the right hand and allow the rein to slip through to get the proper bearing; then close the right hand and replace the hands. With the left rein the positions of the hands are reversed.

To take the Reins in One Hand.

151. To relieve the constraint of the arms by changing their position, as well as to prepare the recruits for the use of the curb bridle, the instructor commands: 1. *In left (right) hand,* 2. *TAKE REINS.*

At the second command bring the left hand opposite the middle of the body; half open and place in it the right rein, holding both reins as explained for the left rein, except that the little finger separates the reins, the right rein coming in about the little finger; close the left hand and drop the right hand behind the thigh.

To Adjust the Reins.

152. Seize the bight with the thumb and forefinger of the right hand; partly open the left hand so as to allow the reins to slip through it; raise the right hand until the reins bear equally; close the left hand upon them, letting the bight fall over the forefinger and right rein; drop the right hand.

To Retake the Reins in both Hands.

153. The reins being in the left hand: 1, ***In both hands,*** 2. ***TAKE REINS.***

Half open the left hand, seize with the right hand the right rein, and hold them as previously described.

To Drop and Retake Reins.

154. ***Drop reins:*** Drop the reins on the horse's neck near the withers and drop the hands behind the thighs.

Take reins: The man retakes the reins and holds them as before dropping them.

To Dismount (without Saddle).

155. 1. ***Prepare to dismount,*** 2. ***DISMOUNT.***

At the first command pass the right rein into the left hand, then seize both reins with the right hand, in front of the left, forefinger between the reins, and place the right hand on the withers, the reins coming into the hand on the side of the forefinger; let go with the left hand and grasp a lock of the mane in front of the withers, the lock coming out between the thumb and forefinger.

At the command ***Dismount,*** raise the body on both hands, carry the right leg, knee bent, over the horse's back without touching it; bring the right leg near the left and come lightly to the ground on the balls of the feet, bending the knees a little; face to the left, drop the right rein, step to the front, sliding the right hand along the left rein, and take the position of stand to horse.

To Mount from the Off Side.

156. The man being dismounted and on the off side of his horse: 1. ***Prepare to mount,*** 2. ***MOUNT.***

The commands are executed as in paragraph 147, but by inverse means.

157. ***To the right,*** 2. ***Prepare to dismount,*** 3. ***DISMOUNT.***

The second and third commands are executed as in paragraph 155, but by inverse means, the man coming to the ground on the off side.

158. If the commands be: 1. ***Squad,*** 2. ***MOUNT,*** the men execute at the command ***mount*** all that has been prescribed at the commands ***prepare to mount*** and ***mount.***

If the commands be: 1. ***Squad,*** 2. ***DISMOUNT;*** or, 1. ***To the right,*** 2. ***Squad,*** 3. ***DISMOUNT,*** the men execute at the command ***dismount*** all that has been prescribed at the commands ***prepare to dismount*** and ***dismount.***

These rules are general.

159. Being at stand to horse, the command ***rest*** is executed as in "The soldier dismounted," except that the men hold the reins and keep their horses in place.

Being mounted, at the halt, at the command: ***Rest,*** or being in march, at the command: ***Route order,*** the men are permitted to turn their heads, to talk, and to make slight changes of position, but they will not lounge on their horses.

Being at stand to horse, the command: ***At ease*** is executed as in "The soldier dismounted."

Being mounted, at the command: ***At ease,*** the men are permitted to turn their heads or make slight changes of position, but preserve silence.

160. To resume the attention: 1. ***Squad,*** 2. ***ATTENTION.***

Each man, if dismounted, takes the position of stand to horse; if mounted, he takes the position of the soldier mounted.

These rules are general.

To Dismiss the Squad.

161. The squad being dismounted: 1. ***By the right (left,*** or ***right and left),*** 2. ***FALL OUT.***

The man on the right leads his horse 1 yard to the front and then marches directly to the stables or picket line.

Each of the other men executes in succession the same movement, so as to follow the horse next on the right, at a distance of 1 yard.

The men remove, clean, and put the equipments in place, and care for and secure their horses under the directions of the instructor or senior noncommissioned officer.

Each man as soon as he has finished stands to heel. The instructor or noncommissioned officer having satisfied himself by inspection that the horse and equipments are properly cared for, and that the precautions required on their return from exercise have been observed, orders the men to fall in, marches them to the company parade, and dismisses them as prescribed in "The soldier dismounted."

162. ***STAND TO HEEL:*** Each man stands at attention, 1 yard in rear of and facing his heel post. At the picket line he stands at attention, 1 yard in rear of and facing his horse.

Mounted Exercises.

163. These exercises are not considered necessary to the training of a good horseman, but, if desired, the various movements can be taken from the drill regulations for cavalry.

Gaits of Horses.

164. The gaits are the walk, trot, canter, and gallop.

The ***walk*** is at the rate of 4 miles an hour, or 1 mile in 15 minutes, or 117⅓ yards in a minute.

The ***maneuvering trot*** is at the rate of 8 miles an hour, or 1 mile in 7½ minutes, or 234⅔ yards a minute. For purposes of individual instruction, the rate of the trot may be diminished to the rate of 6 or 6½ miles an hour by the command slow trot. At the command ***trot out,*** the rate is 8 miles an hour.

The ***canter*** is at the rate of 8 miles an hour and is generally used for individual instruction.

The ***maneuvering gallop*** is at the rate of 12 miles an hour, or 1 mile in five minutes, or 352 yards a minute.

The length of the stride is about 10 feet.

The ***full*** or ***extended*** gallop is at the rate of 16 miles an hour.

To instruct in the maneuvering cadences, stakes are placed on the drill ground, on a convenient line for a long track, 117⅓ yards apart. The men and guides are required to march over the spaces at the rate of one, two, three, or four per minute, according as the gait is the walk, trot, canter, gallop, or full gallop.

Instruction in each gait should be practiced individually and collectively, until each man knows whether he has the proper speed or cadence by the rhythm of motion.

Horses may be trained to walk in column under favorable conditions 4½ miles an hour, making 125 steps a minute, the stride being 0.916 yard.

The average walk of a horse is a mile in 16 minutes, 3.75 miles an hour, making 120 steps (110 yards) per minute, the stride being 0.916 yard.

The average trot of a horse is a mile in eight minutes, 7.5 miles an hour, making 180 steps (220 yards) per minute, the stride being 1.22 yards.

Analysis of Gaits.

165. The walk is a gait of four distinct beats, each foot being planted in a regular order of succession; e. g., right fore foot, left hind foot, left fore foot, right hind foot, and so on.

The trot has two distinct beats; the horse springs from one diagonally disposed pair of legs to the other; between the steps all the feet are in the air.

The canter has three beats, the regular order of succession being, e. g., righ hind foot, left hind foot and right fore foot, left fore foot, and so on. When cantering to the right hand, the horse goes into the air from the left fore foot.

The gallop has four beats, the regular order of succession being, e. g., right hind foot, left hind foot, right fore foot, left fore foot, and so on. When galloping to the right hand, the horse goes into the air from the left fore foot.

The Aids in Horsemanship.

166. The training of the new horse involves the infliction of more or less pain, the necessity for which becomes less as his intelligence is quickened into understanding the lightest pressure.

A horse is *bit-wise* when (the bit being correctly fitted and properly adjusted, par. 257) he obeys the lightest pressure upon either bar.

He is *rein-wise* when he obeys the lightest pressure of the rein on either side of the neck, the bit not being disturbed from its normal position.

He is *leg-wise* when he obeys the lightest correctly combined action of the rider's legs.

The most thoughtful care should be constantly exercised in the combined applications of the aids, that they may not be opposed to each other in their action; i. e., one favoring the intended move, the other opposing it.

Preparatory to the movements, the instructor mounts the squad and explains the uses of the reins and legs.

The reins and legs, the application of which determines the movements and gaits of the horse, are called the *aids.*

The man should not only know when he is to apply a given aid, but he should also understand why he applies it.

The reins serve to prepare the horse to move, and to guide, support, and halt him; their action should be gradual and in harmony with that of the legs.

In using them, the arms should have free action at the shoulder; when a light pressure will be sufficient to govern the horse, the action of the hand should be at the wrist; for greater pressure, the elbow should be carried back, *but without raising the hand.*

In riding, the bridle hand should be kept steady and ought not to move with the body; it should merely take a gentle feel of the horse's mouth; at the same time it must be kept light, for the bit causes pain if pressed constantly on the mouth, destroys its sensibility, and makes the horse's mouth hard.

The hand is light when there is an almost imperceptible alternate feeling and easing of the hand in harmony with the motion of the horse's head, by which the delicacy of the mouth is preserved and the horse made to carry himself light.

That hand is best which, by giving and taking properly and keeping constant touch of the bit, controls the horse with the least force, and will best preserve the mouth.

It is recommended that recruits ride with one rein in each hand; this will prevent the bad habit of holding the left shoulder advanced.

The legs serve to assist in directing the control of the horse. Closing the legs with a slight pressure prepares him to move, or, if moving, to keep him up to the hand. Closed with greater pressure behind the girth, they urge him forward.

Increasing the pressure of the right leg and carrying it slightly to the rear causes the horse to move his haunches to the left.

The pressure of the legs must be an elastic muscular action, suited to the sensitiveness of the horse; a heavy clinging pressure, or dull thumping with the heels, must not be permitted.

The reins act to direct the forehand; the lower legs incite to action and govern the movement of the haunches.

All changes of gait are made gradually. The horse should never be spurred to make a sudden start, nor should the reins be jerked.

To Gather the Horse.

167. Close the legs gently; at the same time turn the little finger toward the body; this is to attract the attention of the horse and to prepare him to move, that his first motions be neither too abrupt nor too slow.

To March.

168. 1. *Forward,* 2. *MARCH.*

At the command *forward,* gather the horse.

At the command *march,* yield the hand and close the legs slightly to the rear, with a firm, equal, and elastic pressure, until the horse yields; then relax the legs and adjust the reins so as to have a slight feeling of the bit.

To Halt.

169. 1. *Squad,* 2. *HALT.*

At the command *squad,* gather the horse without slackening the gait.

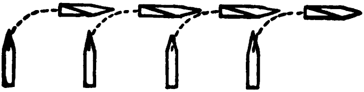
At the command *halt,* rein in by gradually bringing the hands toward the body, turning them on the wrist and carrying the elbows slightly to the rear without raising the hands; at the same time close the knees to steady the horse. When the horse stops, relax the hands and knees.

Being in Line with Intervals, to March by the Flank in Column of Files.

170. 1. *By the right (left) flank,* 2. *MARCH.*

At the first command gather the horse.

At the command *march,* open the right rein and close both legs, the right leg a little more to the rear than the other; turn to the right by moving the horse over a quarter of a circle whose radius is 2 yards; when the turn is nearly ended diminish the effect of the right rein and leg, using the left rein and leg to straighten the horse; when the turn is completed, relax both legs and move off at a right angle to the original direction. The effect of the rein is to lead the horse in the desired direction, not to pull him back on that side.



Pl. 12, Par. 170.

Whenever executing the individual turn at the trot or gallop, the effect of the outer (in this case the left) leg should be increased to sustain the horse.

171. The turn for the individual man is made on the arc of a circle whose radius is 2 yards.

172. A squad marched by the flank, from line with intervals, is in column of files, with the distance of 4 feet from the head of one horse to the croup of the horse next in front.

Marching in column of files, each recruit should so conduct his horse that the recruit next in front of him shall hide all others in front; all follow in the trace of the conductor or leading file.

Distances, when lost, should be regained gradually.

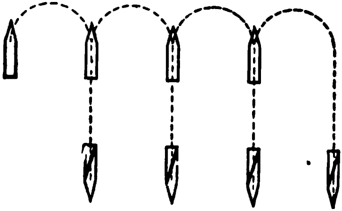
If the column of files be marched by the flank, the squad will then be in line with intervals of 3 yards between files.

173. For convenience in estimating spaces, each horse with his rider is considered as occupying a space of 3 yards in length and 1 yard in width, but by measurement the horse occupies only about 8 feet in length.

174. To halt the column of files: 1. *Squad,* 2. *HALT,* and to resume the march: 1. *Forward,* 2. *MARCH.*

The Individual About.

175. Being in line with intervals, or in column of files: 1. *Right (left) about*, 2. *MARCH.*



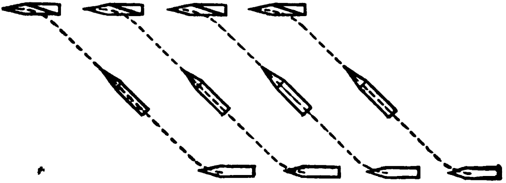
Pl. 13, Par. 175.

Each man turns his horse on a half circle, and then moves off in the new direction, to the former rear.

To Oblique.

176. Being in line with intervals, or in column of files: 1. *Right (left) oblique*, 2. *MARCH.*

Each man turns his horse half right on an eighth of a circle, and then moves at an angle of 45° to his former direction.



Pl. 14, Par. 176.

To resume the original direction: 1. *Forward*, 2. *MARCH.*

Each man turns half left and then moves forward.

Being in line without intervals, the commands and movements are the same.

177. If, when obliquing, the commands: 1. ***Squad,*** 2. ***HALT,*** be given, the men halt in the oblique position; the oblique march is resumed at the commands: 1. ***Oblique,*** 2. ***MARCH.***

This rule is general.

To Change Direction.

178. Marching in column of files: 1. ***Column right (left);*** or, 1. ***Column half right (half left),*** 2. ***MARCH.***

The leading man turns or half turns to the right and marches in the new direction; the other men move forward and turn successively on the same ground.

If at the halt, to march and change direction at the same time; 1. ***Forward,*** 2. ***Column right (left);*** or, 2. ***Column half right (half left),*** 3. ***MARCH.***

At the command ***forward,*** all the men gather their horses.

At the command ***march,*** the leading man turns to the right; the others move forward and in succession turn on the same ground.

To Rein Back.

179. Being in line at the halt: 1. ***Backward,*** 2. ***MARCH,*** 3. ***Squad,*** 4. ***HALT.***

At the command ***backward,*** gather the horse.

At the command ***march,*** keep a firm seat, hold both legs close; carry the weight of the body slightly to the rear, and at the same time rein in gradually until the horse yields to the pressure of the bit and steps to the rear; then immediately yield the hand slightly to allow the horse to regain his balance and relax the legs; continue in the same manner to yield the hand and relax the legs, and rein in and close the legs, giving slight indication to the rear with the weight of the body, so as to keep the horse in continuous motion.

This movement should be frequently practiced to keep the horse light and collected.

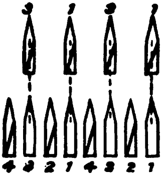
If the horse raises his nose and throws his weight on his haunches without stepping back, hold the hands low and play the reins with light, rapid motions of the hands until he yields.

If the horse throws his haunches to the right, close well the right leg. If to the left, close well the left leg. If this be not sufficient to put the horse in proper position, open the rein c the side toward which he throws his haunches, supporting him at the same time with the other rein.

180. For convenience, the instructor may cause the recruits, upon leading out, to form line with the horses 1½ feet apart, and teach them to mount and dismount in line, to march by the flank from line, and to form line from column of files, only employing these movements to begin and end the drill, the interval of 3 yards being maintained during the instruction.

To Mount in Line (Without Saddle).

181. The instructor causes the men to count off, and commands: 1. *Prepare to mount,* 2. *MOUNT,* 3. *Form,* 4. *RANK.*



Pl. 15, par. 181.

At the first command, the odd numbers, stepping off with the left foot, lead their horses 4 yards straight to the front, regulating by the right; all then prepare to mount.

At the command *mount,* all mount.

At the command *rank,* the even numbers move up in the intervals without jostling or rushing. In forming rank, both mounted and dismounted, the odd numbers hold their horses' heads well up to prevent kicking.

To Dismount (Without Saddle).

182. 1. *PREPARE TO DISMOUNT,* 2. *DISMOUNT,* 3. *Form,* 4. *RANK.*

At the first command, the odd numbers gather their horses and move forward 4 yards, and all prepare to dismount.

At the command *dismount,* all dismount.

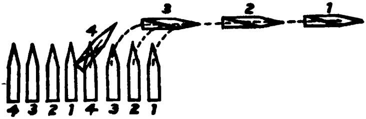
At the command *rank,* the even numbers move up in the intervals.

Being in Line without Intervals, to March by the Flank in Column of Files.

183. Being at the halt: 1. *By file, by the right (left) flank,* 2. *MARCH.*

At the first command the man on the right gathers his horse.

At the command *march,* he turns to the right and moves forward in the new direction. The second man from the right gathers his horse when the first begins to move, he turns to the right so as to follow the first at the distance of 4 feet from head to croup. The movement is executed in succession by the other men as explained for the second.



Pl. 16, Par. 183.

If marching, all halt at the command *march,* except the man on the right. The movement is then executed as before.

To Trot.

184. Being at the walk: 1. *Trot (Slow trot),* 2. ***MARCH.***

At the command *trot,* gather the horse.

At the command *march,* yield the hands a little and close the legs by degrees until the horse obeys, then the hands are gradually replaced and the legs relaxed.

The gait is slow at first, and the instructor sees that the men feel lightly their horses' mouths *without bearing upon the reins,* and explains that the necessary ease and stability are acquired by sitting well down on the horse, or saddle, and partially relaxing the body, thighs, and legs, the hands feeling lightly the horse's mouth.

He requires the men to preserve their seats by balancing the body; that they avoid the common fault of leaning the body too far or curving the back to the rear; that they sit erect and keep the legs close to the horse.

The movements already taught at open intervals at the walk are repeated at the trot. In turning by file to the right or left, the instructor sees that the trot is neither slackened nor increased.

To Pass from the Trot to the Walk.

185. Being at the trot: 1. *Walk,* 2. ***MARCH.***

At the command *walk,* gather the horse.

At the command *march,* rein in, by degrees, carry the weight of the body slightly to the rear, and hold the legs close to prevent the horse from coming to the halt; as soon as he walks, replace the hands gradually and relax the legs.

To Increase and Diminish the Rapidity of the Trot.

186. Being at the slow trot: 1. *Trot out,* 2. *MARCH.*

Gather the horse, then yield the hands, and close the legs by degrees until the horse gradually increases the gait to the trot.

The instructor sees that the horses are kept up to the proper gait, and pays particular attention to the position of the men; if their seats become too much deranged, he brings the squad to the slow trot, or to the walk; this is especially important in the earlier instruction of recruits.

187. To resume a moderate trot: 1. *Slow trot,* 2. *MARCH.*

Rein in, by degrees, until the horse moderates the gait, closing the legs to prevent his taking the walk.

The greater part of the work without saddles or stirrups should be given at the slow trot, as it is unnecessarily fatiguing and difficult to sit at a fast trot without the saddle or stirrups.

To Pass from the Halt to the Trot.

188. Being at the halt: 1. *Forward,* 2. *Trot,* 3. *MARCH.*

At the command *forward,* gather the horse.

At the command *march,* pass at once to the trot as explained from the walk, except that the legs are closed with more energy.

To Halt from the Trot.

189. Being at the trot: 1. *Squad,* 2. *HALT.*

Executed as explained from the walk. The men stop their horses together, but not too abruptly. (Par. 17.)

To Pass from the Front to the Rear of the Column.

190. Being at the walk, to teach recruits the application of the aids: 1. *First man from front to rear,* 2. *MARCH,* 3. *NEXT.*

At the first command, the leading man gathers his horse.

At the command *march,* he leaves the column by the right or left about, according as he is marching to the right or left hand, moves parallel to the column, and enters it again by another about.

The men in succession execute the same movement at the command *next,* which is repeated by the instructor until all the men have passed from front to rear.

To Pass from the Rear to the Front of the Column.

191. Being at the walk: 1. *Last man from rear to front,* 2. *Trot,* 3. *MARCH,* 4. *NEXT.*

At the command *trot,* the man in rear gathers his horse.

At the command *march,* he leaves the column by an oblique, takes the trot, moves parallel to the column, enters it again at the front by another oblique, and resumes the walk, and so on for the others, each moving out at the command *next.*

Should the man enter the column at too great a distance in front of the leading trooper, he slackens the walk until at the proper distance.

To March in Circle.

192. Marching to the right, and the conductor being at least 17 yards from a corner: 1. *Squad,* 2. *Circle to the right (left),* 3. *MARCH.*

At the first command, the leading conductor gathers his horse.

At the command *march,* he describes a circle between the two tracks; the other men follow, each gathering his horse before entering upon the circle, keeping him there by the inner rein, and closing the leg on that side. If at the fast trot or gallop, the haunches should be sustained by the outside leg.

193. While circling, the squad may change gaits, be halted in column, and put in march, as when marching on the track.

To change hands: 1. *Column right (left),* 2. *MARCH.*

The squad passes over the diameter of the circle and circles in the opposite direction by the commands: 3. *Column left (right),* 4. *MARCH,* the command *march* being given when the conductor is 2 yards from the circumference.

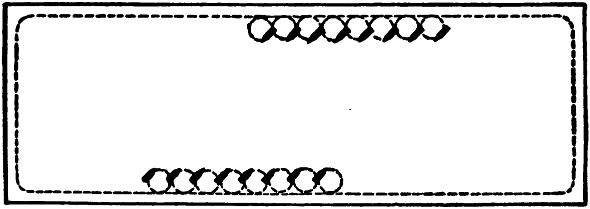
To march again on a straight line, the instructor commands: 1. *Forward,* 2. *MARCH,* when the leading conductor arrives on the long side of the track.

Individual Circling.

194. Marching to the right (left) hand on the long side of the hall: 1. ***Men, circle to the right (left),*** 2. ***MARCH.***

The men should make one circle only, should complete it at the same time, and take the track to the same hand as when the movement began. The instructor should make the circle larger in the beginning, and as the instruction progresses make it smaller.

When marching on the circle to the right, each man opens the right rein and closes both legs; when marching at the trot or gallop, he closes the left more than the right, to sustain the horse.



Pl. 17, par. 194.

If the commands: 1. ***Squad,*** 2. ***HALT,*** be given, the men halt their horses facing in the same direction as the conductors.

To Mount (with Saddle).

195. The horses equipped with saddle and curb bridles are habitually formed in line. The men standing to horse, the instructor causes them to count off, and commands: 1. ***Prepare to mount,*** 2. ***MOUNT.***

At the first command, the odd numbers lead out. (Par. 145.)

All the men drop the right rein, take two back steps, stepping off with the left foot, at the same time sliding the right hand along the left rein; half face to the right; this should place the man about opposite the girth; with the aid of the left hand take both reins in the right, forefinger between the reins, and place the right hand on the pommel, the reins coming into the hand on the side of the forefinger, and held so as to feel lightly the horse's mouth, the bight falling on the off side. *TWO.* Place a third of the left foot in the stirrup, with the assistance of the left hand, if necessary; rest upon the ball of the right foot; grasp a lock of the mane with the left hand, the lock coming out between the thumb and forefinger.

At the command *mount,* spring from the right foot, holding firmly to the mane and keeping the right hand on the pommel; pass the right leg, knee bent, over the croup of the horse without touching him; sit down gently in the saddle; let go the mane, insert the right foot in the stirrup, pass the reins into the left hand and adjust them.

At the command: 3. *Form,* 4. *RANK,* the even numbers move up in their intervals.

Position of the Soldier (with Saddle).

196. Same as previously explained (par. 148), with the following exceptions: Buttocks bearing equally and as flat as possible upon the middle of the saddle; reins coming into the left hand on the side of the little finger, and leaving it between thumb and forefinger; little finger between the reins, right rein above it; the other fingers closed, thumb pointing to the right front in prolongation of the forearm and pressing the reins firmly on second joint of forefinger, the end of the reins falling to the front and outside of the right rein; left forearm close to the body without pressure; the back of the hand nearly vertical; left hand in front of the pommel of the saddle and as close to the top of the horse's withers as possible, without resting upon the pommel; right hand behind the thigh, arm hanging naturally; feet inserted in the stirrups so that the ball of the foot rests on the tread of the stirrup, heel slightly lower than the tread.

Stirrups.

197. The stirrups should support the feet and the weight of the legs only, and be of such length that when the legs are in proper position, the feet out of the stirrups, the treads will be on a level with the lower part of the inner ankle bone.

The length depends somewhat on the formation of the man a man with a thick, heavy thigh requires a shorter stirru than a man with a thin, flat one. For long distances at the gallop and trot a shorter stirrup is required than at a walk.

When riding, the stirrups take up, in a measure, the weight of the body in its descent to the saddle, by yielding of the ankles to prevent shock. This action is an easy, quick stiffening of the muscles which distributes the downward motion between the feet, thighs, and seat.

If, after the man has exercised a short time at the slow trot, he has a close seat, his leg in proper position, with his heel down, but does not easily keep his stirrup, then the stirrup requires shortening.

To Dismount (with Saddle).

198. 1. ***Prepare to dismount,*** 2. ***DISMOUNT.***

At the first command, the odd numbers move forward 4 yards, regulating by the right. All the men then seize the reins with the right hand, in front of and near the left, forefinger between the reins, so that they come in on the side of the forefinger; place the right hand on the pommel; let go with the left hand, grasp a lock of the mane, the lock coming out between the thumb and forefinger; take the right foot out of the stirrup; partly disengage the left foot, body erect.

At the command ***dismount,*** rise upon the left stirrup, pass the right leg, knee bent, over the croup of the horse without touching him; descend lightly to the ground, remove the left foot from the stirrup and place it by the side of the right, body erect; let go the mane; place the end of the reins on the neck near the pommel of the saddle with the right hand, which then seizes the left rein; face to the left, take two short steps, left foot first, slipping the right hand along the left rein, and take the position of stand to horse.

At the command: 3. ***Form,*** 4. ***RANK,*** even numbers lead up into their intervals.

The Curb Bridle.

199. The general principles for the use of the reins and legs, already explained for the watering bridle, apply to the management of the horse with the curb bridle, except that the bridle hand is moved instead of both hands. In all movements of the hand the arm should act freely and without constraint to the body, and as the bit of the curb bridle is much more severe than that of the watering bridle, it must be applied gradually and more gently, particularly in halting and in reining back.

To turn the horse to the right (left): Carry the hand a little forward and to the right (left), so that the left (right) rein bears on his neck.

The Spur.

200. The spur is used as an aid, and also as a means of punishment. It is an aid when it is used to augment the effect produced by one or both legs; it is used as a means of punishment when the horse refuses to obey the action of the legs.

To use it as an aid, the man continues the pressure of the leg until the spur touches the skin and adds its effect to that of the leg.

To use it as a means of punishment, hold firmly to the horse with the legs, turn the toes out a little, yield the hand slightly, and give him several quick applications of the spur behind the girth, without moving the body, until the horse obeys. The spur must never be used to punish unless absolutely necessary, and then with vigor at the moment the horse commits the fault. Unnecessary strokes will arouse his resentment and induce stubbornness; a thumping or a continuous light touch will either make the horse insensible to the proper action of the legs or cause him to kick.

Instruction with Saddle, Curb Bridle, and Spurs.

201. The movements already prescribed are repeated. The instructor causes recruits at first to use the saddle and watering bridle, and does not give them the curb bridle and spurs until they have confidence in their seat and are able to ride fairly well.

As a general rule, after commencing the use of the saddle in the riding-hall exercises, about one-half the time of each drill may be without saddles, the saddles being removed and conveniently placed in the hall.

A man who can ride bareback can ride with a saddle.

To Gallop.

202. The gallop is a succession of leaps during which there is a small interval of time that all the feet are in the air. In galloping on a straight line it is immaterial with which foot the horse leads, but companies will march with greater ease and comfort if all the horses lead with the same foot.

A horse gallops on the right foot when the right fore and hind legs move in advance of the left fore and hind legs; he gallops on the left foot when the left fore and hind legs are in advance. He gallops true when he gallops on the right foot in marching to the right, or on the left foot when marching to the left hand; he gallops false if in marching to the right he gallops on the left foot or conversely.

A horse is disunited when he gallops with the near foreleg followed by the off hind leg, or the off foreleg followed by the near hind leg; in either case his balance is deranged and his strength impaired.

When the horse gallops on the left foot, the rider feels a sensible movement in his position from left to right; when he gallops on the right foot, the movement of the rider is from right to left; when the horse is disunited, the rider experiences irregular movements; when the horse gallops true, he preserves his balance, and in case of a mistake he has his legs under better control and can more easily recover himself. When he gallops false or disunited he is apt to fall whenever he makes a blunder.

203. The *canter* is a short, collected gallop; the horse's forehand is raised, his whole figure is collected and shortened, his neck bowed, and his head drawn in, and he moves by the spring of the haunches. It is the gait that should be used in the riding-hall exercises and mounted gymnastics.

The gallop can not be safely used in the riding hall unless the horse gallops true and the track is in good condition.

204. The recruits marching to the right hand: 1. *To three yards take distance,* 2. *TROT,* 3. *MARCH.*

The leading man takes the trot; each of the other men in succession takes the trot when the one in front of him has gained the distance of 3 yards.

This precaution is taken with recruits to prevent the horses running upon each other and causing confusion.

1. ***Gallop;*** or, ***canter,*** 2. ***MARCH.***

At the command ***gallop,*** gather the horse.

At the command ***march,*** close both legs and rein in with a firm, light hand (this is to bring the haunches under), then carry the bridle hand to the left and press the left leg with vigor; these actions throw the weight on the near hind leg and allow the off fore and hind feet to lead; as soon as the horse rises, give the hand and relax the left leg; reining in slightly and closing the legs with light pressure will keep the horse at the gait and up to the hand; a dead pull should be avoided; if the horse leans on the hand, yield the hand and paly the reins a little, then close the legs and rein in a little abruptly; as soon as the horse obeys, yield the hand.

For recruits the gait at first is restricted to the canter.

To keep the horse true the rider must accommodate himself to all the horse's motions, sustaining him slightly with the outside leg, particularly in changing direction at the corners. When a horse gallops false or disunited, his rider is ordered to leave the column, come to the trot, and pass to the rear of the column, taking care not to interfere with the other men; arriving at the rear he resumes the gallop, the instructor explaining how to keep the horse true. The gallop to each hand will be kept up only once or twice around the riding school, the horses being brought to the trot before changing hands.

In turning corners at a fast gait there is danger that the horse will fall down. If his haunches swing out, he will change so as to gallop disunited, and the danger of his falling will be increased. To prevent this the man should keep the outside leg closed strongly and not lean in, but maintain a vertical position.

The instructor will not at first dwell upon the mechanism of the gait, but allow each recruit to accommodate himself to the motion of the horse without losing his seat.

The men must keep their horses steady; when able to manage them properly at the gallop the distance of 4 feet from head to croup is gradually resumed.

In order to make it easier for the man to start his horse true, the instructor will find it advantageous to march the squad in line with intervals across the hall at the trot, and, upon approaching the track, commands: 1. ***By the right flank,*** 2. ***Gallo*** or, 2. ***Canter,*** 3. ***MARCH.***

Or, give the command *gallop* or *canter* when the squad is circling at the trot.

When the men have been sufficiently exercised at the gallop on straight lines and in circling, they are exercised at the gallop in marching by the flank and circling by man, the instructor taking care that the turns are not made too short; that the men keep their horses true, and that they do not derange their positions.

To Pass From the Canter to the Gallop, and the Reverse.

205. Being at the canter: 1. *Gallop,* 2. ***MARCH.***

Give the hand and close the legs by degrees until the horse increases his gait to the gallop; when the proper cadence is attained, the instructor pays particular attention to the positions of the men; if their seats become too much deranged, he brings the squad to the canter or to the trot.

To resume the canter: 1. *Canter,* 2. ***MARCH.***

Rein in by degrees until the horse moderates the cadence, closing the legs to prevent his taking the trot.

To Pass From the Gallop or Canter to the Trot.

206. 1. *Trot,* 2. ***MARCH.***

At the command *trot,* gather the horse.

At the command *march,* rein by degrees and hold the legs close; as soon as the horse trots, replace the hand gradually and relax the legs.

207. The object of circling on the forehand and haunches is to teach the horse to obey the pressure of the legs and reins, and to instruct the recruits in the application of the aids.

Each of these movements will first be taught to the recruits individually. If the movement be new to the horses, the man should have one or two pliant switches sufficiently long to reach his horse behind the girth, which are used at the time of and on the same side as the pressure of the leg; when the horse yields, much should be made of him; it will encourage the horse to pet him after each effort.

Care is taken that the movements are not hurried, nor too much required of the horse during the first trials.

To Passage.

208. Being upon a long side, the squad is marched by the flank and halted, head to the wall or track, upon arriving near the opposite side. The instructor then commands: 1. *Right (left) pass,* 2. *MARCH,* 3. *Squad,* 4. *HALT.*

At the first command, gather the horse and incline him to the right by carrying the bridle hand slightly to the right.

At the command *march,* rein in, close the legs, to force the horse to the bit; bear the hand well to the right, the left rein pressing the horse's neck, and close the left leg behind the girth, keeping the body erect. Continue the movement by a gentle application of the same means.

The horse's shoulder should precede the haunches; that is, he is held inclined to the right. Only a few steps should be taken at first.

At the command *halt,* replace the bridle hand; relax the pressure of the left leg as soon as the horse moves his haunches and is straight in line.

The application of the reins and legs should be in harmony with the sensibility of the horse; if the horse obliques too much, diminish the bearing of the reins; if he steps too quickly, moderate the effect of reins and legs; if he backs, force him up to the pit by pressure of the legs.

The passage in column may be executed by the application of the same means. The movement will be practiced at the trot and canter.

Jumping.

209. For this exercise the height of the bar should at first be 1 foot, and the width of the ditch 2 feet. As the men and horses become used to jumping, the height of the bar and the width of the ditch are gradually increased, the bar to 3 feet and the ditch to 5 feet; this exercise should generally be practiced near the end of each drill.

A horse that hurries or rushes will become an uncertain and unsafe jumper. If impatient in going up to the bar, he should be halted, reined back, halted and tried again until he takes " coolly.

Horses are taught to jump the ditch and the bar. They are equipped with the watering bridle and are led by a steady horse that is accustomed to jumping.

This instruction is also given on the longe.

The horses are taken in the open field and practiced at jumping shallow ditches, fallen logs, very low fences, etc. If the horse refuses to take the jump, the instructor may give aid with the whip, but in such a way as not to terrify him. If the horse be timid, it is advisable to place the bar on the ground until he passes over it without alarm. Great discretion must be used in applying the whip, and the horses will not be required to jump repeatedly over the same thing or at the same place.

210. The instructor forms the squad in line, about 30 yards from the obstacle, and commands: 1. *First file from the right (left)*, 2. ***MARCH***, 3. ***NEXT***.

The man on the right moves to the front at the walk; he takes the trot when he has passed over about one-third the distance, and then the gallop.

After making the jump, he takes the trot, then the walk, and takes his place in the rank, which is re-formed about 30 yards beyond, and on the right or left of the obstacle, and facing it.

The other men move out successively from the right at the command *next*.

211. In the riding hall the men are formed in two squads, in line, facing each other at opposite ends of the hall; two bars are placed across the track, one on each of the long sides of the hall, about midway.

1. *First file from the right (left)*, 2. ***MARCH***, 3. ***NEXT***.

The man on the right of each squad moves out at the walk and marches diagonally across the hall; on passing each other both take the trot and when abreast of the flank of the opposite squad they take the track at the gallop (or canter), the horse leading with the right foot; after jumping both bars, each man takes the trot, then the walk, passes around the left flank of the opposite squad, marches at the walk diagonally across the hall, and forms on the left of his squad.

212. The other men move out successively from the right (or left) of each squad at the command Next.

This rule is general for individual exercises.

213. In making the flying jump, the horse must not be hurried nor allowed to rush, but be held steady and straight for the bar or other obstacle. The rider should sit down snugly in the middle of his saddle, the horse firmly inclosed between the legs, the hands held low and steady, and the body not forward, and thus ride steadily and smoothly at the obstacle. The muscles of the back and shoulders should not be contracted. The waist should be supple, so as to adopt in its motion the movement of the horse.

To Jump the Ditch.

214. Ride straight for the ditch at a steady, animated gait, with the legs closed firmly; the instant the horse springs, give the hand, and as he grounds sustain him with a light, steady pressure.

215. The instructor must observe that the rider does not thrust his weight into the stirrups nor throw out his elbows, nor check his horse too abruptly. If the hand is held so that the back of the hand is nearly vertical with the ground, there will be little tendency to turn out the elbows. If the horse is checked with a sudden violence after making the jump, he takes it as a punishment, and may thereafter try to avoid the obstacle.

Recruits are apt to try to sustain themselves by the reins; to prevent this the instructor may find it necessary to allow them to place the bridle hand on the horse's neck until they have gained confidence. If necessary the bar should be lowered to the height at which the recruit can easily keep his seat.

The rider will be practiced jumping obstacles without stirrups and may be without saddles.

Alignments.

216. Being in line without intervals: 1. ***Right (left)***, 2. ***DRESS***, 3. ***FRONT***.

At the command ***dress*** all the men move up slowly on the basis of the alignment established by the instructor, each casts his eyes to the right so as to see the buttons on the breast of the second man from him, sits squarely on his horse, keeps h
horse straight in ranks, and touches lightly with his stirrup

stirrup of the man on his right. At the command *front*, given when the last man is aligned, all cast their eyes to the front. All movements in ranks must then cease.

In dressing the first two or three men are accurately aligned as quickly as possible, in order to afford a base for the rest of the squad.

This rule is general.

To March in Line.

217. Being in line at the halt: 1. *Forward,* 2. *MARCH,* 3. *GUIDE RIGHT (LEFT).* The squad moves off promptly, the guide marching straight to the front at the regular gait.

The instructor observes in marching in line that the squad marches straight to the front at the regular gait; that the men keep their horses straight in the rank; that they maintain the interval of about 6 inches from knee to knee (or light touch with stirrup) toward the side of the guide; that they yield to pressure from that side and resist pressure from the opposite direction; that if too much closed toward the guide they carry the bridle hand from that side and close the leg on the side of the guide; that if the interval be too great they carry the hand toward the guide, and also close the leg on the opposite side, and, while habitually keeping the *head to the front,* they occasionally *glance* toward the guide. If in advance, they rein in *gradually.* If in rear, they *gradually* increase the gait until the alignment is regained.

218. Marching in line, to effect a slight change of direction: *INCLINE TO THE RIGHT (LEFT).*

The guide turns his horse slightly to the right and marches in the new direction. The other men gradually conform to the movements of the guide, increasing or diminishing the gait according as the change is toward or opposite the side of the guide.

To Halt.

219. Whenever the squad is in motion, it is halted by the commands: 1. *Squad,* 2. *HALT.* *This rule is general,* the command *section, platoon, company,* etc., being substituted for *squad.*

To March Backward.

220. 1. ***Backward***, 2. ***Guide right (left)***, 3. ***MARCH.*** All the men rein back, dressing on the guide.

This movement is used for short distances only.

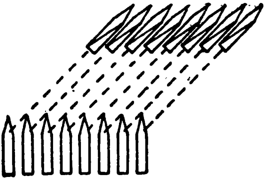
Being in Line, to Oblique.

221. 1. ***Right (left) oblique***, 2. ***MARCH.***

At the command ***march***, each man executes a turn of 45° to the right, his right knee in rear of the left knee of the man on his right. The squad moves in the new direction, regulating by the right, in a line parallel to the original front.

To resume the original direction: 1. ***Forward***, 2. ***MARCH.***

Each man turns 45° to the left and marches straight to the front, regulating on the guide.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To Turn and Advance.

222. Being in line at the halt or at the walk, the instructor commands: 1. ***Right (left) turn***, 2. ***MARCH***, 3. ***GUIDE RIGHT (LEFT).*** The man on the right turns his horse 90° to the right, on an arc with a radius of about 4 yards, and moves forward in the new direction without changing (increasing) the speed. Each of the other men turns his horse to the right approximating an oblique, and, moving at the trot by the shortest line, places himself on the new line, when he takes the gait and direction of the pivot man. During the turn the guide is, without command, on the pivot flank. The guide is announced when all men have arrived on the line. If marching at a trot the pivot man continues at the trot. All others move at the gallop. If marching at the gallop, the pivot takes the canter; all other men continue the gallop, each taking the canter on arriving in line; as soon as all the men have arrived on the line all resume the gallop.

Being in Line, to Form Column of Fours to the Front.

223. 1. *Right (left) by fours,* 2. ***MARCH,*** 3. ***GUIDE RIGHT (LEFT).*** The right four moves straight to the front, the other fours oblique to the right, so as to follow the leading four at the proper distance.

If marching, rule 2, paragraph 361, applies for gaits.

To Change Direction.

224. Marching in column of fours: 1. *Column right,* 2. ***MARCH.*** The leading four executes right turn, the other fours move forward and turn on the same ground as the first. *Column half right* is similarly executed, except that the leading four makes a half turn.

Being in column of fours, at the halt, to march and change direction at the same time: 1. *Forward,* 2. *Column right (left),* 3. ***MARCH.*** To make a slight change of direction, incline to the right (or left).

Being in Column of Fours, to Move to the Rear.

225. 1. *Right about,* 2. ***MARCH.*** The leading four turns to the right over a half circle with a radius of 4 yards. The other fours move forward, and, following the first, turn on the same ground.

Being in Column of Fours, to Form Line to the Front.

226. 1. *Squad,* 2. *Left (right) front into line,* 3. ***MARCH.*** The leading four move straight to the front, the rear fours oblique to the left until the preceding four is uncovered, when it moves straight to the front until it arrives on the line.

Rule 1, paragraph 361, applies for gaits.

Being in Column of Fours, to Form Column of Twos to the Front.

227. Being at a halt: 1. *By twos, march,* 2. ***GUIDE RIGHT (LEFT).***

The right two, Nos. 1 and 2 of the leading four, moves straight to the front, the left two, Nos. 3 and 4 of the leading four, keep their horses' heads straight until their horses' heads are passed by the croups of the horses of the right two, when they oblique to the right and follow the leading two, at a distance of 4 feet. Each of the other fours form in the same manner as soon as the left two in the preceding four commences to oblique. Nos. 3 and 4 always follow in rear of Nos. 1 and 2, no matter on which side the guide may be.

If marching, Rule 2, paragraph 361, applies for gaits.

Being in Column of Fours, to Form Column of Files.

228. 1. *By file,* 2. ***MARCH.***

The movement is executed according to the principles of the preceding paragraph. No. 1 of the leading four moves forward and is followed successively by Nos. 2, 3, and 4, who preserve a distance of 4 feet from head to croup. When No. 4 commences to oblique, No. 1 of the succeeding four marches forward or takes the increased gait.

Column of files from column of twos is formed in similar manner, No. 1 leading the column.

Being in Column of Twos, to Form Column of Fours.

229. Being at the halt: 1. *Form fours,* 2. ***MARCH.*** Nos. 1 and 2 of the leading four move straight to the front. The instructor commands *halt* when the leading two have moved 3 yards. Nos. 3 and 4 of the leading four oblique to the left until uncovered, then march to the front and halt when abreast of Nos. 1 and 2. The other twos march forward and form fours successively as explained for the first four. Nos. 3 and 4 of each four commence the oblique to the left when Nos. 1 and 2 are at 3 yards from their position.

If marching, rule 1, paragraph 361, governs the gaits.

Being in Column of Files, to Form Column of Fours or Twos.

230. 1. *Form fours,* 2. ***MARCH.***

The move is executed on the same principles as in forming fours from column of twos, No. 1 of each four being the base, and Nos. 2, 3, and 4 obliquing to the left and forming on the left of No. 1.

231. 1. ***Form Twos,*** 2. ***MARCH.*** The movement is executed on the same principles as in forming fours, Nos. 1 and 3 being the base men, No. 2 forming on the left of No. 1, and No. 4 on the left of No. 3.

Movements in Column of Twos.

232. The column of twos changes direction, halts, and advances by the same commands and means as a column of fours.

Being in Column of Fours, to Dismount.

233. Being at the halt or marching: 1. ***Prepare to dismount,*** 2. ***DISMOUNT.***

At the first command, Nos. 1 and 2 open to the right and front, Nos. 3 and 4 to the left and front, and all halt. The four opens only so far as to allow sufficient room for each man to dismount without interference from the others. Nos. 1 and 4 open a little more than 2 and 3.

The column of twos dismounts by the same commands and means. In mounting from column of twos or fours the horses are opened out as in the preceding paragraph at the preparatory command for mounting. At the commands ***Forward, March,*** either before or after mounting, the column moves forward, the files closing toward the center.

Manual of the Pistol.

234. The instruction under this head will conform to what has already been described in The Soldier Dismounted. (Paragraphs 94 to 108.)

CHAPTER II.—THE DRIVER.

Object and Sequence of the Instruction.

235. The object of this instruction is the detailed training of the individual drivers.

First. In harnessing and unharnessing, and in fitting and properly cleaning and caring for harness and packs.

Second. In managing and maneuvering a single pair, and in the proper care of draft horses and mules and pack mules.

Third. In managing and maneuvering the different pairs of a team hitched.

Quiet, well-trained animals will be used in the instruction of recruits.

236. In order to vary the mounted instruction of recruits. their training as drivers may advantageously be begun as soon as they have had elementary instruction in the duties of the soldier mounted. The two kinds of instruction are then continued concurrently.

SECTION II.—*General provisions.*

237. When two or more carts or wagons march in line, the instructor, as soon as the march in line is begun, designates the element on one flank or the other as the guide of the movement, thus: ***GUIDE RIGHT (LEFT).*** The other elements align themselves on the guide thus indicated and maintain their intervals from that flank.

238. If marching in column, or if marching obliquely from column, the leading element is, without indication, the guide of the movement.

Rests.

239. The rests are executed and the attention resumed according to the general principles heretofore prescribed; the drivers, when dismounted, remain close to their teams, so as to keep them under control.

240. The position of the driver dismounted, at attention, will be just outside the right wheel, abreast of the footboards, and holding the reins.

241. After exercise, the drivers, when dismounted, should raise the collars from the shoulders and adjust the harness if necessary.

242. Each cart driver is assigned two horses, and each wagon driver of the combat transportation is assigned four mules.

Disposition of the Harness.

243. In garrison the cart harness is arranged on pegs on the heel posts, as follows: Both bridles hung from the peg by their headstalls; the traces, reins, and collars, unlocked, of both horses hung from the peg close to the heel post; the pole yoke, with martingales attached, is hung from a spike driven into the side of the heel post.

In the field the harness is laid back on the footboards; reins, bridles, and collars on top, and covered with the paulin.

The wagon harness is arranged, as nearly as possible, in a similar manner.

To Harness.

244. A pair of quiet, well-trained horses, in a double stall, is assigned to the recruit, who should be supervised at first by a thoroughly instructed man.

The instructor causes a team to be harnessed, points out and names the different parts of the harness, and explains their uses; he then causes the harness to be taken off and replaced on its peg.

245. The harness being on the heel posts, the instructor causes the recruits to ***stand to heel,*** and commands: ***HARNESS,*** when each man will place the harness upon the team in the following order and manner:

Collar: Each driver puts on and locks the collar of his off horse, then that of his near horse.

Traces: He lays the middle of the trace of the off horse over the horse's back, toggles on opposite sides, and, beginning with the off trace, passes the toggles through the loin loops from the rear and attaches them to the tugs on the collar. The traces of the near horse are then attached in the same manner. The rear ends of the traces are left hanging over the backs of the horses.

Bridle: He bridles the off horse and adjusts the reins, and then bridles the near horse and adjusts the reins.

Unless instructions to the contrary are given, the halters are removed before bridling.

Yoke: The driver takes down the yoke; places himself between his horses, facing in the same direction with them; fastens the breast strap of the off horse, then that of the near horse; passes the martingale of the near horse between the forelegs, through the standing loop on the cincha; attaches the hooks at the end of the side straps to the martingale D ring; secures the martingale of the off horse in the same manner; then passes out in rear of the near horse, and stands to horse.

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To Unharness.

246. ***UNHARNESS,*** when the harness will be removed in the following order and manner:

Unyoke: The driver passes between his horses from the rear, unhooks the martingale of his near horse, and draws the martingale through the standing loop on the cincha; then does the same with respect to the off horse; unhooks the inside end of each breast strap, detaches the neck yoke and hangs it on its spike.

Bridle: He detaches the reins from the near horse, puts on the halter, fastens the halter strap to the manger, does the same with respect to the off horse and hangs the bridles and reins on the peg, the near bridle next to the post.

Traces: He disengages the near trace of the near horse and lays its middle over the horse's back, toggle on the near side; disengages the off trace and lays it beside the near trace, toggle on the off side; removes the traces and hangs them on their peg. In like manner he removes and hangs up the traces of the off horse.

Collar: He removes the collar of the near horse, then that of the off horse, and hangs them up, the near collar next to the post.

To Harness and Unharness in the Field.

247. Executed as in garrison, with such modifications as the disposition of the harness requires. The horses are ordinarily tied by the halters to the wheels of the carts while harnessing and unharnessing.

Fitting Harness.

248. The cart harness is the artillery wheel harness, without saddles, and fitted with a back strap.

When the recruit has become somewhat familiar with the method of harnessing and unharnessing, he will be instructed in fitting harness, the importance of which will be thoroughly impressed upon him.

The ***bridle*** is fitted as prescribed in The Soldier Mounted.

The ***collar,*** when adjusted, should freely admit the thickness of the hand between the lower part and the throat, and th fingers between the sides and the neck. A short collar chokes a horse by pressing on the windpipe; a narrow one pinches and rubs the neck. A broad collar works about and galls the shoulders.

The *back strap,* when adjusted, should admit the breadth of the hand between it and the horse's back.

The *breech strap* should be adjusted so that it will bear quickly when the horse is required to check the movement of the cart, but will not impede his movement while in draft. This adjustment is most important. It can best be made by observing the horse in draft and tightening the straps as much as can be done without impeding the free movement of the animal while in draft.

The *hip straps* should be of such length that the breech strap will bear just below the point of the buttocks. The lower the breech strap is adjusted the less does it assist the horse in checking the movement of the cart.

The *loin straps* should be so adjusted that the traces, when in draft, will be straight and without downward pull on the loops that support them.

The *traces:* The length of the traces must depend in a great measure on the size of the horse and his stride. The rule is to allow about 14 inches from singletree to hind quarters. The traces should be adjusted so that the line of traction will be straight from the singletree to the collars. This rule will regulate, in some measure, the length of the loin straps.

All trace chains have a ring at one end and a hook at the other; the hook is passed through the D ring at the end of the trace, and hooked back into any desired link. By this means the length of the trace is adjusted, and the trace chain need not be removed except for cleaning.

To Lead Out.

249. The teams being harnessed, the instructor commands: ***LEAD OUT.*** The teams are led out directly and to the carts.

To Hitch.

250. ***Hitch.*** Each driver passes behind the near horse; places himself between his horses, on the left of the pole; engages the end of the pole in the pole-yoke ring; then goes behind the near horse and attaches his traces to the singletree, beginning with the off trace. He then passes around the front of his team at double time, and hitches the off horse, beginning with the near trace.

He then mounts, if the section is mounted; if it is dismounted he stands as heretofore prescribed in paragraph 240.

To Unhitch.

251. *Unhitch.* Each driver dismounts, if mounted; detaches the traces of his off horse, and places the end of the traces over the horse's back, as prescribed for harnessing; passes around the front of his team at double time, and unhitches his near horse in like manner; passes between his horses, disengages the pole from the pole-yoke ring and lowers the pole to the ground.

To Dismiss the Teams from the Park.

252. *Lead in.* The teams are then conducted to the stable or other designated place.

253. The instructor then commands: *Unharness.*

The harness is removed, cleaned, and properly put in place; the horses rubbed down and cared for. Having satisfied himself by inspection that these duties have been properly performed, and that all the precautions required on return from exercise have been observed, the instructor causes the harness to be covered, orders the men to *fall in,* marches them to the company parade ground, and dismisses them.

Management of Teams in Draft.

254. In all movements from a halt, each driver gathers both of his horses just before they are to move; if in march and the gait or direction is changed both horses are gathered just before they change the gait or direction. Care should be taken that both the horses move off together and change the gait at the same time.

255. In starting a cart or wagon, it is especially important that both the horses of the team should throw their weights into the collars gradually but simultaneously. Unremitting a tention is required upon the part of every driver in order that his horse shall at all times do its proper share of the work.

By observing these important rules, a team is enabled to pull steadily together and the horses are not fatigued by jerks, which make them balky, gall their shoulders, and break the harness.

256. In reducing the gait or in halting, the movement must be checked gradually so as not to bring undue strains upon the horses or the harness. Ordinarily about 2 yards should be gained in bringing a cart to a halt from a walk; in the exceptional cases when carts are halted while moving at rapid gaits, from 5 to 10 yards should be gained in halting from a trot; from 10 to 15 in halting from a gallop.

The command for halting must be so given that the carts may be properly brought to rest at the place desired.

257. The gaits are always changed *gradually,* so as not to strain or worry the horses by sudden movements. In all cases, whether moving from a halt, changing gait, or halting, the horses should be made to act together, but they should always be handled quietly and kindly and allowed a sufficient time for their movements.

258. In executing the abouts and the turns at a trot or gallop the radius is sufficiently increased to permit the horses to execute the movement with ease; and in the abouts the gait is moderated to avoid overturning the carts.

MARCHINGS.

To March to the Front.

259. 1. *Forward,* 2. *MARCH.*

The teams move out simultaneously and march straight to the front. If in line, they preserve the alignment and the interval from the guiding flank.

To Halt.

260. 1. *Carts,* 2. *HALT.*

Each driver stops his team, but not suddenly, and keeps it straight.

To March by the Flank.

261. 1. *Carts,* 2. *By the right (left) flank,* 3. *MARCH.*

Each driver wheels his team to the right by moving the off horse over a quarter circle whose radius is 4 yards and causing the near horse to quicken his movements so as to keep abreast of the off horse. On the completion of the wheel, each driver moves his team straight to the front in the new direction. If executed from column, a guide should be announced when line is formed.

To March to the Rear.

262. 1. *Carts,* 2. *Right (left) about,* 3. ***MARCH.***
Executed as explained for the march by the flank, except that each driver moves his team over a half circle instead of a quarter circle.

Being in Column, to Change Direction.

263. 1. *Column right (left),* 2. ***MARCH.***
The leading cart wheels to the right as explained in paragraph 260; the rear carts follow in the track of the leading cart, and wheel on the same ground.

264. *Column half right (or left)* is similarly executed, except that only one-eighth of a circle is passed over.

To back the Carts.

265. *To the rear:* Being at a halt, to move a short distance to the rear: 1. *Backward,* 2. ***MARCH,*** 3. *Carts,* 4. ***HALT.***
The drivers rein back their horses, taking care to keep the pole straight; at the command *halt* they stretch the traces and halt.

Alignments.

266. Being in line at a halt, the instructor sees that the driver on the flank toward which the alignment is to be made is in the desired position, and commands: 1. *Right (left),* 2. *Dress,* 3. ***FRONT.***

At the command *dress,* the other drivers look to the right and align themselves accurately, keeping their pairs straight and preserving their intervals. At the command *front,* they turn their eyes to the front.

The instructor may place himself on either flank, and give a general alignment by ordering any driver to move one or both of his horses forward or backward.

CHAPTER III.—THE PACKER.

Object and Sequence of the Instruction.

267. The object of this instruction is the detailed training of the individual packers in harnessing and unharnessing and in fitting and properly cleaning and caring for harness, and in managing and maneuvering the different mules of a section.

GENERAL PROVISIONS.

Guides.

268. The general instructions for the guide in marching in line and in column, and for rests, etc., are similar to those given for the soldier mounted, with such modifications as may be necessary.

The Individual Packer.

269. The aparejos stand upon the lower edges of their panels with the cruppers doubled forward; upon each rest, in order, its frame, folded cincha, folded saddle blanket, and corona. The corona is doubled, canvas inside, and lies on the blanket, fold to the front. The bridle, bit to the left, and the blind are laid across the corona or hung on harness pegs.

270. In garrison, the aparejos are aligned upon racks in rear of the mules or in the wagon shed. In the field they are aligned parallel to and about 5 yards from the picket line. They should rest on poles and be covered with canvas.

The Aparejo Packsaddle.

271. The aparejo packsaddle consists of the aparejo proper and the detachable frame. The aparejo proper consists of two panels of leather, each braced with light ribs held in place by a boot stick at the bottom and a saddle bar at the top of the panel; the panels are filled with hay, each saddle being fitted to its mule. Over the panels is the sobrejalma of canvas, leather faced, the ends of which are protected by wooden shoes held in place by leather caps. The sobrejalma is secured to the aparejo by thongs at the ends of its center line. To the panels is laced the crupper. The cincha is of canvas, doubled, with a leather cincha strap laced to it at one end, which is faced with leather and braced with an iron rod. This strap, at its attachment to the cincha, carries a rendering ring through which it passes in tightening. Fifteen inches from this end of the cincha a leather thong, the finger loop, is attached, which is used to secure the end of the cincha strap after cinching. The other end of the cincha carries a curved piece of pipe which takes the place of a cincha ring. The cincha should be 8 inches longer than the aparejo with which it is used.

272. The frame consists of metal arches and side bars, riveted to spring-steel side plates for distributing the pressure on the saddle, and has suitable attachments for supporting the wireless chests, sections of mast, generator, etc.

273. Each aparejo is provided with a corona, or pad, made of several thicknesses of blanket, lined with canvas; also a saddle blanket.

To Fold the Blanket.

274. Hold the blanket by the corners, the short edge up and down. Bring the short edges together, the right hand holding the corners, the left holding the folded edge at the top. Shake the blanket and spread it on the ground, the hands still holding the corners. Carry the upper edge to the front so as to leave a portion of the blanket 22 inches wide on the ground. Then fold back so as to leave the blanket in three equal folds, 22 inches wide and 42 inches long. Shake well and fold once more, bringing the ends together, and place across the aparejo.

To Blind the Mule.

275. A pack mule is ordinarily blinded during harnessing and unharnessing, loading and unloading. To teach it not to move when blinded, the blind must always be lifted before requiring it to change position.

To Harness.

276. Two packers are assigned to each mule. A quiet, well-trained mule is assigned to two recruits. Each recruit should be supervised by a thoroughly instructed man. The instructor causes a mule to be harnessed and points out and names the different parts of the pack outfit and explains their uses. He then has the harness taken off and placed in rear of the mule.

277. The pack outfit being in rear of the mule, the instructor causes the recruits to stand to heel and commands *harness,* upon which the harness is placed upon the mule in the following order:

Blind: The packer of the mule being harnessed, on the near side, takes hold of the halter with the left hand; grasps an edge of the blind near one end with the right hand; carries it over the mule's neck to the off side, tail down; brings the blind well to the front over the mule's ears and places it over the eyes, the tail on top of the neck.

Bridle: The packer of the mule being harnessed, on the near side, passes the reins over the mule's head, snaps the hook of the watering bridle into the off halter ring with the left hand; opens the mule's mouth with the thumb of the right hand, inserts the bit, and snaps the hook in the near ring; secures the leading rein in the throat latch.

Corona: The off packer on the off side places the corona, canvas side down, well forward on the mule's back and slides it to the rear until its front edge is just behind the point of the withers, taking care that the hair lies smooth beneath it.

Blanket: The near packer on the near side places the folded saddle blanket on the corona, taking care that its lower edges slightly overlap to prevent bunching, the off packer assisting from the off side.

Saddle: The near packer on the near side grasps the front edge of the aparejo near the boot with his left hand, the rear edge near the boot with his right hand; the off packer on the off side grasps the aparejo in a corresponding manner; both together raise the aparejo, pass it over the mule from the rear and place it slightly in rear of its proper position.

Crupper: The packer on the near side places his left hand, palm up, on the front edge, the right hand, palm down, on the rear edge of the crupper; the packer on the off side takes a corresponding position; both together raise the crupper well up, reverse it and turn it down over the croup. The off packer raises the mule's tail and places the dock piece well under it, taking care that no hairs are caught. He then places his left hand, thumb down, at the top and rear of the aparejo, his right hand at the rear of the boot, and moves it forward to its place. The near packer on the near side throws the upper fold of the cincha toward the off packer, guiding the cincha to the center of the aparejo with the left hand. The off packer passes the cincha well under with his right hand, holding it in position over the center of the off-side boot until it has been received by the near packer. He then steps to the mule's shoulder and, facing to the rear, places his right hand on the collar of the aparejo, thumb under the corona, and with his left hand at the rear of the boot pulls the aparejo forward.

Cinch: The off packer holds the aparejo in place, raising the corona from the withers with his right thumb, taking care not to raise the front of the aparejo. The near packer holds the end of the cincha with his left hand, passes the double cincha strap through the cincha eye from above, brings it up in front and passes it through the rendering ring from above; grasps the double cincha strap with the left hand well under and with the right hand passes the end through the eye in rear of the other part; places the palm of his right hand against the rear end of the boot, pulls the strap taut with his left hand, and calls ***set.*** At this the off packer passes in rear and observes whether the aparejo is straight. If not, it is correctly adjusted. He then takes hold of the cincha strap between the near packer and the mule, the palm of the right hand up, that of the left hand down, and places his right knee against the boot. The near packer raises his left foot to the boot and both pull together until the cincha eye is at the edge of the boot, the cincha in the center of the aparejo. The near packer holds the cincha strap with his left hand below his right, and passes the finger loop from above and back into the right hand of the near packer, who secures it. The packer of the harnessed mule removes the blind and places it on his left shoulder with the tail under the right arm.

To Unharness.

278. ***Unharness,*** at which the recruits unharness in the following order:

Saddle: The packer on the near side unfastens the cincha strap and throws its end across the aparejo; folds the cincha with the strap inside and places it on top of the frame. Both packers push the aparejo slightly to the rear. The near packer places his left hand on the upper edge of the crupper, his right on the lower edge near the dock piece; the off packer takes a corresponding position; both together raise the crupper and reverse it forward over the cincha; take hold of the aparejo as in saddling, pass it backward over the mule, and lower it carefully to its place in rear.

Blanket: The packer on the near side grasps the front and rear edges of the blanket at their middle points, removes it, allows it to fall into a fold between his hands, places it along the near side of the corona, grasps the corona at the middle points of its front and rear edges, removes it, and places both on the aparejo.

Bridle: The packer of the mule being unharnessed removes the watering bridle in the reverse order of bridling (par. 277) and places it and the blind on the corona.

279. All recruits are instructed in the duties of both near and off packers.

To set up the aparejo.

280. ***To rib up:*** Unlace the slits and handholes; soak the aparejo in tepid water for about 15 minutes, drain it and lay it flat, back pieces up; insert the boot stick and the saddle bar through the slit in rear and press them to their places at the boot and the center stitch line, slotted sides up; insert the numbered set of nine ribs through the slit in rear in their numerical order and seat them in that order from collar to rear in the slots of the boot stick and saddle bar, butts at the boot; secure the top of each rib as it is seated by inserting the key bar at the front edge below the collar and passing it over the rib in place; fasten the key bar to the collar by the thong.

NOTE.—Aparejos are issued to the service with ribs in place. Ribs are furnished in sets of nine. Each rib is numbered at its butt to correspond to its proper numerical position in the panel, counting from the collar to the rear. Each rib is also stamped with the size of the aparejo for which it is made. The aparejos are furnished in 58, 60, and 62 inch sizes. The ribs for a 60-inch aparejo are therefore marked "1–60," "2–60," "3–60," etc. Should repairs or alterations make it necessary to rib up, the butt of the fifth rib is seated in its slot, the overlap at its slot in the saddle bar is marked and cut away, and the other ribs are cut to the exact resulting length.

Guava, willow, dogwood, hickory, or any other wood combining the qualities of permanent elasticity and strength may be used to replace broken ribs.

281. *To fill or pad:* Turn the aparejo over, belly pieces up; procure about 6 pounds of long, fine, soft, elastic hay; taking a little at a time, tease or "mix" it thoroughly, insert it through the handhole and thus gradually fill the body of the aparejo with a smooth and even layer, not more than 2 inches thick.

NOTE.—Other filling may be used in necessity, such as moss, excelsior, curled hair, sea grass, but these substitutes are difficult of manipulation in alterations necessary to accommodate the rigging to injuries of the mule. By teasing or "mixing" is meant the arrangement of the straws so that they will cross one another. The body of an aparejo is that part which comes in contact with the body of the mule. As 3 inches of the lower portion of each boot stick and 3 inches of the upper portion of each saddle bar must not come in contact with the mule, no filling should be pressed under the boot stick or within 3 inches of the center stitch line. The body course tapers, however, so as to overlap the boot stick and saddle bar, and also tapers toward front and rear.

282. *To face up or dress:* To adjust the aparejo more accurately to the shape of the mule, introduce filling and press it well into the corner of the front boot; working toward the handhole, continue the facing along the boot stick and front edge, gradually increasing its thickness to about an inch at 7 inches from the corner and forming its inner edge into the arc of a circle concentric with the handhole, the thickness tapering to the ends of the arc; continue the facing for 3 inches more toward the handhole, rapidly decreasing the thickness to nothing; proceed in exactly the same way at the collar. Under no circumstances should the collar facings reach within 7 inches of the center of the handhole. Connect the front boot and collar facings by a dressing along the front edge about 3 inches wide and an inch thick, decreasing in thickness toward the handhole and toward the middle of the edge.

283. Rib up, fill, and dress the other panel in the same manner.

NOTE.—In facing up, introduce the filling with the hand, palm up, so as not to disturb the body course. In case the leather will not yield enough to permit the filling to be introduced well into the corners, the tamping stick may be used to raise it. This stick, used with the commercial aparejo, is 4 or 5 feet long, 1¼ inches in diameter, wedge shaped for 4 inches from one end, the edge of the wedge being about one-fourth inch thick and grooved. The object of the boot facing is to cause the boot stick to carry horizontally and parallel to the center line of the mule and give free action to the mule's elbow. Mules of large barrel will require a thicker facing than that described. The object of the collar facing is to cause the saddle bar to carry horizontally and parallel with the center line of the mule and to protect the mule's withers. Mules with high withers will require a thicker facing than that described. In setting to the shape of the mule the aparejo bends at the middle of the front edge. It is important that the body course remain undisturbed during dressing and that the instructions given be carefully followed to avoid sore withers and tails and body and belly bunches.

284. ***To attach the crupper:*** Stand the aparejo on its boot in its normal position; secure a lance thong to the front hole on the upper facing of the crupper on each side and fasten the crupper with short thongs to the center holes of the carrier pieces on the rear of the aparejo; pass the crupper lace thong through the second hole from the top of the front facing of the aparejo, through the second hole of the crupper, through the third hole of the aparejo facing, through the fourth hole of the crupper, and so on, finishing through bottom holes of facing and crupper and tying to the crupper hole.

NOTE.—In lacing the crupper to the aparejo, the thong must be passed through the holes from the outside and must not be twisted, the lacing must not cross, and it is important that the tie be made on the last hole of the crupper instead of the aparejo.

285. ***To assemble the saddle:*** Place the sobrejalma on the aparejo so that its staple holes fit over the staples on the latter; seat the frame and pass the straps on the sobrejalma through the staples; pass the cincha through the frame over the side bars, finger loop up and cincha to the left; double the cincha over the frame, strap inside; double the crupper forward so that the dock piece rests on the cincha.

Remarks on the Pack Saddle.

286. When the set-up aparejo is to be filled, no soaking is necessary; instead, make the belly pieces pliable by rubbing with a wet sponge.

Mules weighing 850 to 900 pounds require a 58-inch aparejo; 1,000 pounds, 60-inch; 1,100 pounds, 62-inch; for heavier mules requisition should be made for larger sizes.

When the mule is loaded the cincha, in travel, should free the elbow by about an inch; more than this will prevent a proper grip on the belly.

If the boots ride high on the body of the mule, or if they reach under the belly, even though they ride horizontally and parallel to the center line of the mule, the aparejo will be likely to turn easily. This fault encourages injuriously tight cinching.

If one or both boots flare out or turn in toward the mule, cinch sores and sore tails result, or belly and body bunches are caused.

The width of the collar arch clearance should be at least 5½ inches. If it is too narrow or too wide, or if the saddle bars slope downward toward the front, there will be sores on the withers; if they slope to the rear there will be injuries over the loins, called kidney sores.

If the lacing of the crupper is drawn too tight at the bottom the lower edge of the crupper will rub the buttocks and cause abrasions.

The object to be attained is the uniform distribution of the weight of the load over that portion of the mule's body anatomically suited to carrying a burden so that the saddle will ride with little motion and without friction of the bearing surface of the body. The contact of the bearing surface of the saddle must be close at all points. As the mule's body swells from front to rear, the more or less cylindrical shape of the aparejo after the body course is laid must be modified by facing up so as to provide a concave surface to fit over a convex surface. But as the barrel of the properly conformed mule is nearly cylindrical through the rear half or more of the contact surface, no facing is necessary, as a rule, in the rear part of the aparejo, although conformation may require it exceptionally.

Care of the Harness.

287. The leather parts of the harness should be exposed to the sun as little as possible and should be cleaned whenever dirt, grit, or dust has collected on them or when they have become saturated with the sweat of the animal. The parts should be separated and each sponged with a lather of castile soap and warm water. They should then be rubbed nearly dry and a lather of Crown soap and warm water should be applied. Excess of moisture in this later should be permitted to evaporate in a shaded place. This treatment frequently applied is sufficient, but if the leather has become harsh and dry, its dressed side should be lightly coated with neatsfoot oil after the castile lather and allowed to dry before the Crown soap lather is applied, the latter removing surplus oil. Polishing of the leather parts should not be permitted, as it leads to the surreptitious use of commercial materials that are often detrimental to the life of the leather.

Leather is injured by exposure to the sun, by water, and by the use of too much Crown soap or of common commercial soaps. In proper condition it is clean, soft, smooth, pliable, and free from stains.

Immediately after the harness is removed from the animal, canvas parts should be scraped free from all adhering substances with a dull but smooth-edged knife. Especially constant attention must be given to the cleanliness and pliability of the canvas side of the corona and crupper and to the dock piece.

Woolen parts and hair cinchas should be rubbed between the hands or hung up and beaten with switches or wands to remove dust, mud, and hairs and to make them soft and pliable. They should be exposed frequently to the sun, completely unfolded, and blankets should be occasionally washed in tepid water.

Metal parts must be kept free from rust, dirt, sweat, and hair. Those issued with coats of paint or lacquer are to be maintained in that condition. Bright parts should be polished. The tongues, rollers, and keepers of buckles must work freely, to which end the straps must be unbuckled in cleaning.

To Gather the Mule.

288. The packer raises his right hand, to attract the attention of the mule, collect him and prepare him to move.

Management of the Led Mule.

289. The led pack mule is managed by the leading reins or halter. By quiet and gentle treatment he must be taught to work and to effect changes of gait and direction evenly. He should not be turned short, but on the arc of a circle of 1 yard radius. He should be led with a loose rein, urged on, if he lags, by the driver in rear. He should not be threatened by his packer. The mule must always be gathered before moving from a halt, before halting, and before changing gait or direction.

To Dismiss the Packer.

290. The instructor may conduct the packers in column into the stable and halt the column so that each driver is opposite his stall; or he may first form the drivers in line in the vicinity of the stable or park, and command: 1. *By the right (left),* 2. ***FILE OFF.*** In the latter case the packers file off in succession, as explained in The Soldier Mounted, and halt when opposite their stalls or the place designated for unharnessing.

291. The instructor commands: ***UNHARNESS.***

The harness is removed, cleaned, and properly put in place; the mules rubbed down and cared for. Having satisfied himself by inspection that these duties have been properly performed and that all the precautions required on return from exercise have been observed, the instructor causes the harness to be covered, orders the men to fall in, marches them to the company parade ground, and dismisses them.

292. The mules assigned to the transportation of a wireless pack set are designated respectively (1) generator mule, (2) chest mule, (3) mast mule, (4) kit mule.

CHAPTER IV.—THE SECTION MOUNTED.

The Wire Section.

293. The wire section is normally composed of 13 mounted men formed in column of fours and the wire cart and its driver.

294. The chief of section is on the right of the leading four and the cart is 2 yards in rear of the mounted men. When th section is acting alone the chief of section may go where his services are most needed.

295. The fours are formed from right to left, as follows: No. 1, the lineman; No. 2, the messenger; No. 3, the horse holder; No. 4, the operator.

296. The section is maneuvered as prescribed for the company mounted and by similar commands.

To Open Station and Move Off.

297. To open station and move to the front from a halt: ***OPEN STATION.*** At this command the linemen of the first and second fours, the messenger of the first four, and the chief of section turn out of the column, to the right, the horse holder and operator of the first four turn out of the column to the left, the two linemen, remaining mounted, prepare to follow the reel cart and lay out the wire, the lineman of the second four in front. The remaining men of the first four all move to the rear of the cart and dismount, except the horse holder, to whom the horses are turned over. The messenger unties the wire from the cart and pulls off enough slack and holds it or makes it fast to some convenient anchor. The operator prepares his buzzer, connectors, and ground rod, and opens the station in the location indicated.

When the end of the wire has been removed from the cart, the messenger commands: ***DRIVE ON,*** at which the cart, preceded by the men of the second and third fours, except the lineman of the second four, moves out over the indicated route, at first slowly, in order not to break the wire. The two linemen follow the cart attending the wire until the second station is opened, when the lineman of the first four returns back over the line to his station. His place is taken on the line work by the lineman of the second four, who is replaced by the lineman of the third four.

298. The manipulation of the machinery of the wire cart for handling the wire will be a part of the duty of the cart driver, unless an operator be placed on the cart, in which case the latter may handle the clutch, etc. The reel must always be stopped before a march to the rear is taken up.

299. The chief of section rides near the cart, in order to supervise the laying of the line.

300. If the section is in march, it is halted before giving the command for opening station.

301. As each station is established the operator will call up the initial station.

To Recover the Wire.

302. 1. *Close station,* 2. ***REEL UP.*** At the first command the lineman of the station immediately starts back over the line. laying out the wire in a convenient place for recovery. The operator calls up "all stations" on his line, sends G. B., and signs his station call, cuts out his buzzer, and mounts. The horse holder now mounts and, if this is the third station, attends the loop, using the spare pike which is lashed to the pole of the wire cart; otherwise one of the linemen present attends the loop. The messenger takes the hand guard from the cart and feeds the wire upon the reel.

At the second command the wire cart moves off back over the line, reeling up the wire. As the loop approaches the cart the man attending it will call out *clutch,* when the driver will throw out the clutch in order to allow the loop to drop back.

303. Intermediate stations are closed by the command *close station,* and when the cart approaches the members of these stations take charge of the work of recovering the line back to the next station.

304. Members of the section not engaged in laying out or recovering the line ride in front of the cart. This rule is general.

305. As the cart approaches the end of the line an increased gait will be taken to gain sufficient momentum to reel up the slack. When all the wire is on the reel the section is re-formed in its proper place.

The Pack Wireless Section.

306. The pack wireless section is normally composed of 10 mounted men and 4 pack mules.

307. The men, except the chief of section, are numbered from 1 to 9. The mules are designated, respectively, as the "generator mule," the "chest mule," the "mast mule," and the "kit mule." Each mule is led by one of the men, and the section is formed in column of twos, the led mules being considered as one of the set of twos.

308. The chief of section is on the right of the leading two, composed of Nos. 1 and 2, No. 1 on the right. These are followed by Nos. 3 and 4, and then by Nos. 5, 6, 7, and 8, leading, respectively, the mules carrying the generator, the chests, the masts, and the kit in order from front to rear, the mules on the right. No. 9 rides in the rear, and it is his duty to observe the packs and to keep up any lagging mule.

309. It is the duty of all men, so far as they may be able, in addition to leading their own mules, to urge forward the mule immediately in front.

310. When the section is acting alone, the chief of section may go where his services are most needed.

311. The section is maneuvered as prescribed for the company mounted, and by similar commands.

312. When the section is acting alone, it may when necessary march in column of files, in which case each man leading a mule will ride in front of his mule.

To Open Station.

313. 1. ***Open station,*** 2. ***DISMOUNT.*** At the command ***open station,*** Nos. 3, 4, and 9 ride left front into line on No. 2; No. 5 stands fast, and Nos. 6 and 7 lead their mules left front into line on No. 5; No. 8 leads his mule by the left front, in front of and opposite the center of the line of mounted men. At the command ***dismount,*** the section is dismounted and the chief of section and Nos. 1, 2, 3, 4, and 9 turn their horses over to No. 8, and proceed to unpack the mules (except the kit mule). Nos. 5, 6, and 7, holding their mules in position, move their horses out of the way. Nos. 1 and 2 unpack the generator, the chief of section and No. 9 the chests, and Nos. 3 and 4 the antenna bags and mast, which are placed on the ground in rear of their mules; Nos. 5, 6, and 7 then lead off their horses and mules and turn them over to No. 8. As soon as the mules are unpacked No. 2 removes the cover from the generator, Nos. 3 and 4 take the contents from the bags, No. 4 takes out the counterpoise and places the pins or pegs for anchoring the antenna on the ground in front of the chest, No. 3 fixes the insulator with antenna attached into the top joint of the mast, which No. 1 holds on the ground in front of the chest; Nos. 1 and 3 then unloop and straighten out the antenna cords, placing them on the ground. No. 9 will now step on the chest and hold the joint of the mast in position, while Nos. 1, 2, 3, and 4 take up the antenna reels and pins and run out the antenna in the directions indicated by the chief of section. As soon as the antenna and the rope attached have been unreeled, the antenna men face in the direction of the mast and watch the chief of section for signals. When the antenna is paid out, No. 9 will raise the mast hand over hand, the other sections being placed underneath by No. 7. While the mast is being raised Nos. 5 and 6 set up the generator or batteries and untie and pay out the counterpoise, securing its center to the generator or anything to hold it in place. Nos. 7 and 9 connect up the instrument chests and the generator or batteries.

When the mast is up, the chief of section may command *tie in,* when the antenna men will secure the rope attached to the antenna to the pins which they will drive into the ground.

As soon as the antenna is secured the antenna men will assist in laying out the counterpoise.

314. The chief of section will then detail an operator, one or two messengers as needed, men to turn the generator, and guards to protect the antenna from being run into and injured. The latter will also see that the antenna pins and cord do not become insecure.

To Close Station.

315. The station is closed, taken down, and packed in a similar manner at the command *close station,* each man handling and packing the same equipment as in unpacking and opening station. When the mules are packed and the men are all mounted, the chief of section commands *fall in,* when the normal formation in column is resumed.

316. Each man, having a permanent assignment of duty, soon learns to do his part quickly, and after the men have become proficient in handling the equipment the entire operation of unpacking and opening station or packing and closing station may be effected by the command *open (or close) station.*

The Wagon Wireless Section.

317. The wagon wireless section is normally composed of 18 mounted men, the wagoner and engineer, who ride on the wagon, and one wagon wireless set, drawn by 4 mules.

318. The mounted men are formed in column of fours, except one man who rides in rear of the wagon. At drills and ceremonies he will ride on the left of the leading team.

319. The chief of section is to the right of the leading four and the wagon is 2 yards in rear of the mounted men. When the section is acting alone the chief of section may go where his services are most needed.

320. In forming fours a noncommissioned officer will be No. 1 of the leading four, and the horse holders will be No. 4 of the leading four and the third four.

321. The wagon wireless set consists, briefly, of a pintle-type wagon, drawn by 4 mules. The telegraph instruments are attached to the front element, and the engine and dynamo are attached to the rear element, and electrically connected with the instruments by cable. On the rear vehicle are also carried the mast, consisting of 10 sections 8 feet in length; the antenna, which has nine cords, one of which is the connecting cord; two sets of guy ropes, four to each set; and the rubber insulated wire counterpoise, consisting of eight branches.

322. The section is maneuvered as prescribed for the company mounted, and by similar commands.

323. The mounted men, except the chief of section, are numbered from 1 to 17 for the purpose of prescribing their duties in opening and closing station: Thus, Nos. 1, 2, 3, and 4 are antenna men, Nos. 5, 6, 7, and 8 are guy men, Nos. 9 and 10 (usually noncommissioned officers) direct the antenna men and guy men during the erection of the mast, Nos. 11, 12, and 13 assemble and raise the mast, Nos. 14 and 15 lay out the counterpoise and assist the engineer, and Nos. 16 and 17 are horse holders.

To Open Station.

324. The section will always be halted before the command *open station* is given.

325. At this command the wagoner unhitches his team. The chief of section moves the mounted men a sufficient distance to be out of the way of the antenna and guy ropes when the mast is raised and dismounts them. The horses are turned over to the horse holders (Nos. 16 and 17), and the remaining men proceed to unpack the wagon, each man assisting in unpacking and making ready that part of the equipment which it is his duty to handle in establishing the station—i. e., Nos. 1, 2, 3, and 4 unpack the antenna and pins or stakes and pay out the antenna under direction of the chief of section; Nos. 5, 6, 7, and 8 do the same with the two sets of guy ropes and pins; Nos. 11 and 12 take position on top of the front element of the wagon, prepared to raise the mast; Nos. 9 and 10, assisted by No. 13, unpack the sections of the mast and place them on the ground, convenient to the point at which the mast is to be raised; Nos. 14 and 15 unpack the counterpoise and place it in position.

As soon as the top joint of the mast is unloaded, No. 13 places the top insulator (with antenna attached) in the top of the joint and raises it vertically to Nos. 11 and 12. He then places the remaining joints in place, and assists Nos. 11 and 12, who raise the mast hand over hand. The five smaller joints form the upper part of the mast. No. 13 also places the guy rings in place at the top of the fourth and seventh sections. As the mast is being raised the antenna and guy men, standing facing it, will keep it vertical by skillful handling of the antenna and guys, under direction of Nos. 9 and 10. No. 1 should be in rear of the wagon, with Nos. 2, 3, and 4, in sequence to his left, in a circle around the mast. This will bring No. 3 opposite No. 1, and No. 4 opposite No. 2. Each man holds two adjacent antenna cords, and carries a pin. The guy men, each with an upper and a lower guy rope and a pin, take position, in a corresponding manner, in a smaller circle around the mast, No. 5 being between No. 1 and the mast. This will bring No. 7 opposite No. 5, and No. 8 opposite No. 6. No. 9 will direct Nos. 1, 3, 5, and 7, and No. 10 will direct Nos. 2, 4, 6, and 8. When it is desired that an antenna or guy be pulled out the command *out* will be used. When it should be slacked off the command *in* will be used. Thus, if No. 3 is holding his antenna too slack, No. 9 commands: ***No. 3, OUT.*** The guy ropes which each man holds are referred to, respectively, as *upper* and *lower*. When the mast is up the chief of section commands *tie in*. At this command the guy men secure the guys to pins driven into the ground with the assistance of the counterpoise men with hammers. Antenna men secure the proper antenna cord to a pin driven into the ground and then secure the remaining antenna cords in a similar manner midway between those first placed. In doing this all move to the right from the antenna cord first secured. If hammers are necessary in driving the pins, they will hold the antenna cords until assisted by the counterpoise men or guy men.

As soon as the command *tie in* is given, No. 9 makes the proper connection for the antenna and counterpoise, while No. 10 supervises the tying in and sees that cords and ropes are kept taut.

326. As soon as the wagoner starts to unhitch his team, the engineer will see that there is sufficient gasoline in the tank, oil in the cups, water in the proper receptacles (if the engine is water cooled), and connect the dynamo to the instrument by means of the cable and generally make ready to start the engine and dynamo.

327. When the mast is up, the chief of section details the operators (usually either No. 9 or No. 10 for the first relief), messengers, and guards for the antenna and guys, and makes such disposition of the remaining men as the situation demands. If the station is to be maintained open any length of time, he also directs that the picket line be established or the horses otherwise disposed of.

The wagoner takes care of his team.

To Close Station.

328. At the command *close station,* the operator removes the antenna and counterpoise connections, the guy men take up the pins and hold the guys, each antenna man first takes up the pin and frees the end of the antenna cord which he last secured and turns it loose, then proceeds to his other antenna cord, pulls up the pin, and holds the cord while the mast is being lowered. The mast is lowered by the same men in the same positions as when being raised. Nos. 9 and 10 direct the antenna and guy men. The counterpoise men recover the counterpoise; the engineer shuts off all valves, the wagoner brings his team close to wagon, and, when the mast is down, hitches it to the wagon. All men assist in packing the equipment which they unpacked. When all the apparatus has been securely packed the chief of section commands ***stand to horse,*** when all men proceed to their horses and obey this command. The men are then mounted and the section formed by the appropriate commands.

329. In opening and closing station, all men who have finished the duty herein assigned to them may be directed by the chief of section to perform such other duties as may be necessary.

CHAPTER V.—THE COMPANY MOUNTED.

330. The special object of this instruction is the training of the personnel of the company with a view to mobility, either as separate units of the company or the company as a whole. The company should be so trained that the drill-ground maneuvers may be executed with a certain degree of accuracy, and so that in the field a complete unit to perform the desired duty can be detached by command without halting the column or interrupting in any way the march.

331. Much of the instruction can be advantageously done in platoon and section. The captain completes the training of the company as a whole.

The captain should require the ***section mounted*** and the ***platoon mounted,*** properly manned, horsed, and equipped, to be instructed by their chiefs in accordance with the principles prescribed for ***The Company Mounted.*** In fact, much of the instruction in signaling, either mounted or dismounted, can be conducted advantageously in this manner.

General Provisions.

332. The saber will not be used except at ceremonies. When the captain draws saber the other officers will also draw saber. When mounted, the saber is habitually attached to the left side of the saddle. On dismounting, for duties connected with signaling, it is not removed from the saddle.

333. The ***rests*** are executed and ***attention*** resumed according to the principles already explained.

Organization of the Company.

334. The field company is normally organized into six sections, consisting of four wire sections and two pack wireless sections, but the drill is suitable for any number of sections.

335. A field wireless company is normally organized into six sections, consisting of four pack wireless sections and two wagon wireless sections.

336. For drill, the company may be formed into platoons of two sections each. The two wireless sections of the field company will form one platoon, which will normally constitute the left platoon of the company in order in line or the rear platoon in order in section column. The two wagon sections of the field wireless company will form one platoon, which will constitute the left platoon in line or the rear platoon in column. In the field or on the march the remainder of the combat train will form a fourth platoon under command of the supply sergeant.

Duties of Individuals.

337. The captain commands the company, and is responsible for its training and efficiency.

The lieutenants command platoons, and will be assigned to such duties as the captain may deem necessary.

The master signal electricians are responsible to the captain for the condition of the technical equipment of the company.

The first sergeant is the assistant of the captain, and is responsible to him for the general good order, police, and discipline of the company. In action he remains with the captain and under his immediate orders.

The supply sergeant is responsible to the captain for the care and preservation of the materiél not issued to the sections.

The stable sergeant is responsible to the captain for the general care of the public animals assigned to the company, and the good order and police of the stables and picket lines, etc.

The mechanics, under the orders of the supply sergeant, are responsible for the repair of the materiél pertaining to the company.

Chiefs of sections command the sections and will be held responsible to the captain for the condition of their equipment and the training and efficiency of their sections.

The drivers and packers are directly responsible to their chiefs of sections for their animals, harness, and equipment. They will report at once to their chief of section any injury to animals or materiél.

The operators are responsible for the serviceable condition of their instruments and will report at once to their chiefs of sections any need of repairs.

The linemen are responsible for maintaining the section lines intact. They will carry the necessary equipment, and will report to the chief of section at once if their materiél is not in their possession.

Messengers are responsible for the delivery of all messages, no matter what the conditions.

Formation of the Company and Posts of Individuals.

338. The habitual formations are: *The order in section column, the order in line,* and *the order in platoon column.*

339. *The order in section column* is that in which the sections of the company follow each other in the order, or the reverse order, of their numbers, from front to rear. The distance between the mounted men and carts in a section and between sections is 2 yards.

If the sections of each platoon are abreast, the formation is called *the order in platoon column.*

340. *The order in line.*—The sections of the company are formed abreast of each other in the order, or the reverse order, of their numbers from right to left. The interval between the sections is that which would result from the sections moving from the order in section column by the flank.

341. *In platoon column* the distance between two sections is that which would result from wheeling the platoons from the order in line to the order in platoon column, and the interval between the sections is the same as in the order in line.

Posts of Individuals.

342. *The captain* in order in line is 8 yards in front of the company, opposite the center. In order in section column he is opposite the center of the column and 16 yards from the flank.

In order in platoon column the captain, except at ceremonies, is posted opposite the leading section of the center platoon and 16 yards from its flank. In column the captain is on the left when the first section leads and on the right when the column is reversed.

The chiefs of platoons.—In order in line they are posted in line with the leading fours of their platoons and midway between their two sections. In order in section column they are 4 yards from the center of their respective platoons and on the same side as the captain. In order in platoon column they are posted as in order in line.

The master signal electricians are posted in all formations opposite the centers of the first and third platoons, their positions corresponding to that of the first sergeant.

The first sergeant.—The first sergeant is posted in order in line 4 yards in rear of the center platoon. In order in section column and in platoon column he is on the flank opposite the captain and 4 yards from the center of the center platoon.

The chiefs of sections are posted to the right of the front rank of their sections.

The guidon in line and in platoon column is abreast of the front rank of the company and 2 yards from the flank toward which the guide has been announced. In section column he is abreast of and 2 yards from the leading chief of section.

The supply and stable sergeants, when present with the company mounted, are posted between the master signal electricians and conform to the movements prescribed for them.

The trumpeters follow 2 yards in rear of the captain.

343. The wire carts are ordinarily arranged in park in order in line; the sections arranged from right to left in the order of their numbers. The aparejos are arranged on a line with the front of the poles of the carts. The instrument wagons and other transportation may be arranged in a similar manner 16 yards in rear, or the whole may be arranged in line, as circumstances permit. The intervals between carts and wagons are normally the same as when the company is in the order in line. The picket line is usually mounted on the carts and wagons, and in the pack wireless sections on the kit mules for bivouac or temporary camp. The animals of the sections are always tied on the line between the carts or wagons in the order of their sections.

To Form the Company Mounted.

344. The company is formed dismounted and marched to the stables by the first sergeant, where he commands *by section,* ***FALL OUT.*** The drivers then harness their teams and the men saddle their horses, under the direction of the chief of section. The latter then causes the wire cart of his section to be hitched up, verifies and makes an inspection of his section, causes it to mount, and reports the result to his chief of platoon. The chiefs of platoons then make an inspection of their platoons, after which the company is formed under the direction of the senior chief of platoon and brought to rest. On the arrival of the company commander the company is brought to *attention* by the senior chief of platoon. The captain then commands *report.* The chiefs of platoons then report in the order of rank the result of the verifications and inspections.

345. The master signal electricians, the supply and stable sergeants, if present, and the guidon, take their posts when the company is formed. The trumpeters report to the captain at such time and place as he may direct. The chiefs of platoons join their platoons at the stable or picket line, and superintend the formation of their platoons.

To Dismiss the Company.

346. The captain commands: *Dismiss the company.*

The chiefs of platoons and the master signal electricians fall out. The company is returned to the stables or picket line by the first sergeant, who then commands: *By section,* ***FALL OUT.*** The chiefs of sections then supervise the placing of the transportation under shelter or in park; the horses in the stable or on the picket line; and see that horse equipment and harness has been properly put away, and that all equipment has been properly disposed.

347. *The section column* is the habitual column of route. The mounted men of the wire sections may, when conditions require it, be formed in column of twos instead of column of fours. Being in march, route order or at ease are executed according to the principles already prescribed. Sabers are returned if drawn. To resume attention the captain commands: *Company,* ***ATTENTION.***

The captain marches 8 yards in front of the leading element, followed at 2 yards distance by the trumpeters and guidon, the latter on the right; the chiefs of platoons usually march near the rear of their platoons, but they and the chiefs of sections may go wherever their presence is necessary; the file closers close in on the column.

348. To avoid dust, the captain may direct the officers and file closers to march on the windward side.

Constant attention should be given by each officer and chief of section in order to insure the proper handling of teams and mounts and the adjustment of equipment and harness. They should see that no horse is overheated and that each team horse does his share of work, that distance is preserved, and that no men or carriages move at a faster gait than that ordered.

No practice is more fatiguing to men and injurious to horses than the alternate trotting and walking so often seen at the rear of a column.

At halts on slopes, vehicles should be turned at right angles to the road, so that the horses may be eased.

Commands and Signals.

349. Commands are given by the captain, either verbally, by trumpet signals, or by signals made by the arm. When verbal commands are given by the captain they should be supplemented by the appropriate trumpet or arm signals.

350. Chiefs of platoons repeat the commands of the captain, or give appropriate commands to their platoons in time to insure the proper execution of the movement. The chiefs of platoons ordinarily give their commands verbally, supplemented, if necessary, by the appropriate arm signal, and see to it that the commands of the captain are understood and correctly executed by their platoons. If the chief of a platoon does not hear a command, he governs himself by what he sees executed by the adjoining platoon.

351. Chiefs of sections repeat the commands of the chiefs of platoons or give appropriate commands to their sections in time to insure the proper execution of the movement. Chiefs of sections ordinarily give their commands by signals with the arm, supplemented, if necessary, by verbal commands, and see to it that the command is understood and correctly executed.

Arm Signals.

352. Signals are ordinarily made with the right arm, but may be made with the left arm when convenient. If the saber is in the hand, the signals are made in a manner similar to that prescribed for the arm.

353. Ordinarily, before making a signal for the execution of a movement, the captain places himself where he can be seen by the company, generally with his horse facing in the same direction as the horses of the company, and commands or signals attention, or causes it to be sounded on the bugle. The captain may signal attention by a long blast on a whistle. The signals prescribed for the different movements are the *preparatory* signals; for the signal of *execution* the arm is extended vertically and then lowered quickly to the side. If the movement involves a change in the direction of march, the captain moves his horse in the new direction on making the preparatory signal.

Preparatory Signals.

354. *Attention.*—Extend the arm vertically and move it slowly back and forth from right to left.

Forward.—Extend the arm vertically and lower it to the front until horizontal.

By the right (left) flank.—Extend the arm vertically and lower it to the right (left) until horizontal.

Right (left) about.—Extend the arm vertically and describe slowly a large horizontal circle with the hand; then extend the arm to the left (right) and describe a horizontal arc to front and right (left).

Right (left) oblique.—Extend the arm obliquely upward to the right (left) and front, and then lower the arm, describing a vertical circle on the right (left) side of the horse.

To increase the gait.—Carry the hand to the shoulder, forearm vertical; extend the arm vertically from this position and repeat several times.

To decrease the gait.—Hold the arm horizontally above and in front of the forehead.

To indicate an increased or decreased gait for a maneuver, the appropriate signal is made just after the preparatory signal for the maneuver.

To halt.—Extend the arm vertically and hold it there until the signal is obeyed.

To change direction to the right (left).—Extend the arm vertically; lower it to the left (right) until horizontal and describe a horizontal arc to the front and right (left).

Right (left) by section.—Point at the right (left) section and signal forward.

Right (left) front into line.—Extend the arm vertically and describe several large vertical circles on the right (left) side of the horse.

Maneuvers of the Company.

355. The guide of a section is the section commander. Chiefs of sections supervise the gait and direction of march of their sections. In section column, the guide of the leading section is the guide of the company.

356. The guide of the company in line is the guide of the right or left section.

357. During an oblique march the guide of the company is, without indication, the guide of the leading section on the side to which the oblique is made.

358. The guidon always posts himself as prescribed in paragraph 342. Shculd the guide be changed, he hastens to his new post, except that he does not change post during an oblique movement. With this exception, the guide is always toward the guidon.

Gaits.

359. In changes of formation, the section which establishes the new direction and rate of march will be termed the directing section.

360. The following rules govern the gaits during changes of formation:

361. *Rule No. 1:* When a change of formation requires certain sections to gain ground so as to reach specified positions abreast of the directing section, the captain may or may not announce an increased gait for the movement. If he announces an increased gait, the directing section maintains its gait; the other sections move at the gait announced until they have reached their new position, when they take the gait of the directing section.

If the captain does not announce an increased gait, the directing section reduces its gait one degree; the others maintain their gait until they reach their new positions, when they take the gait of the directing section. If the movement is executed from a halt or while marching at a walk, and an increase of gait is not ordered, the directing section advances toward the front of the new formation and halts at the command of the captain.

Rule No. 2: When a change of formation requires the directing section to gain ground in order to precede the other sections, the captain may or may not announce an increased gait for the movement. If he announces an increased gait, the directing section takes the increased gait at once, the other sections take it up so as to follow the movement in their proper order.

If the captain does not announce an increased gait, the directing section maintains its gait, the others reduce the gait one degree, and take the gait of the directing section in time to follow the movement in their proper order. If the movement is executed from a halt or while marching at a walk and an increase of gait is not ordered, the directing section moves at a walk, the others remain halted or halt and take up the gait of the directing section as before explained.

Reducing gait one degree is to be understood as passing from the gallop to the trot, from the trot to the walk, or from the walk to the halt. Increasing the gait one degree is the reverse of this.

To Align the Company.

362. The company being at a halt.

If the section on the side toward which the alignment is to be made is not in proper position, the captain establishes it in the position desired, and commands: 1. *Right (left),* 2. *DRESS,* 3. *FRONT.* At the command *dress* the other sections move forward or backward, the chiefs of sections aligning themselves; the men and drivers turn their heads to the right and dress on their corresponding elements in the section on their right. The captain places himself on the right of the leading element of the right section, facing to the left. He quickly establishes the leading element of the next section to arrive on the line, and superintends the alignment of the other sections as they arrive on the line. The captain then commands *front,* and takes his post.

To March to the Front.

363. 1. *Forward,* 2. *MARCH.*
Executed simultaneously by all the sections moving straight to the front, taking care to maintain their proper relative positions in the formation.

To Halt.

364. 1. *Company,* 2. *HALT.*
Executed by all sections stopping simultaneously, but not suddenly.

To March by the Flank.

365. 1. *By the right (left) flank,* 2. *MARCH.*
Executed simultaneously by all the sections executing column right, as prescribed in paragraph 224, the carts following in rear of the mounted men.

366. If the company is in line, with closed intervals, the following modifications apply: The movement is successive; the section on the indicated flank begins the movement by executing column right; the others take it up in turn so as to follow, at the proper distance, in the track of the sections which preceded them. If executed while marching, all the sections, except the one on the indicated flank, halt and then resume the march so as to follow at the proper distance in the column.

To March to the Rear.

367. 1. *Right (left) about;* 2. *MARCH.*
Executed simultaneously by all sections moving to the right and rear over half a circle with a radius of 4 yards, taking care to quickly track the section preceding them in the new formation, if the company was in column at the command, or to promptly take up the announced guide if it was in line.

368. If the company is in line with closed intervals, the following modifications apply: The captain first commands: 1.

Right sections forward, 2. ***MARCH.*** The right section of each platoon moves forward so as to clear the left section. If the captain orders an increased gait for the maneuver the right sections take the gait indicated; if an increased gait is not ordered the left sections reduce the gait one degree, or, if halted, they remain halted. As soon as the right sections are clear of the left sections the captain gives the command for the about, which is executed by all the sections at the gait of the right sections. On the completion of the about the sections in rear increase the gait so as to move up to their positions in line.

Being in Line or Column, to March Obliquely.

369. 1. *Sections,* 2. *Column half right (left),* 3. ***MARCH.***

All the sections execute column half right simultaneously, as previously described. The sections move on parallel lines. The guide of each section takes care to align himself on the guide of the section toward which the movement is made. To resume the original direction, the command will be: 1. *Sections,* 2. *Column half left (right),* 3. ***MARCH.***

To Change Direction.

370. Being in section column: 1. *Column right (left),* 2. ***MARCH.***

The leading section executes column right, as explained in paragraph 224; the sections in rear follow the leading section and turn on the same ground.

Column half right (half left) is similarly executed, except that the turn is only one-eighth of a circle.

371. Being in line: 1. *Company right (left) turn,* 2. ***MARCH,*** 3. *Guide right (left),* or 3. *Company,* 4. ***HALT.*** The pivot section executes column right. The other sections increase the gait one degree, preserving their intervals from the pivot section and take the gait of the latter on arriving abreast of it.

Company right half (left half) turn is similarly executed, except that the pivot section executes column half right.

If the company is marching at a gallop, the pivot section will take the canter at the command *march;* the other sections will take the canter when abreast of the directing section. When all of the sections are in line, the captain commands: 1. *Gallop,* 2. ***MARCH,*** 3. ***GUIDE RIGHT (LEFT).***

To Close or Extend Intervals in Line.

372. 1. *On (such) section,* 2. *Close (extend) intervals,* 3. ***MARCH.***

The normal closed interval is 8 yards. If the captain wishes any other interval than the normal closed or normal interval to be taken, he announces the interval before giving the second command; for example: 1. *On first section,* 2. *To 20 yards,* 3. *Extend intervals,* 4. ***MARCH.***

The indicated section moves straight to the front, the other sections incline toward or away from the indicated section and move to the front when at the proper interval. Rule No. 1 governs the gait.

To Form Section Column to the Front from Line.

373. 1. *Right (left) by section,* 2. ***MARCH.***

The right section moves straight to the front. The other sections, in turn, move by the right flank and follow in the column at 2 yards distance. Rule 2, paragraph 361, governs the gait.

To Form Line from Section Column.

374. To the front: 1. *Right (left) front into line,* 2. ***MARCH.***

The leading section moves straight to the front. Each section in rear executes column half right until opposite its place in line, when it executes column half left, moves to the front, and takes its place on the line. Rule No. 1, paragraph 361, governs the gait.

375. On the right (left): 1. *On right (left) into line,* 2. ***MARCH.***

The leading section executes column right and then moves straight to the front in the new direction; the other sections move forward beyond the preceding sections, and successively execute column right when by so doing they will be opposite their positions in line with proper intervals, and then move forward until abreast of the leading section. When an increased gait is ordered, all of the sections will take it, but the leading section will resume the original gait when it has turned out of column. If moving at a trot or gallop and no increased gait is ordered, the leading section, after completing the turn, will decrease its gait one degree. As here modified, Rule No. 1, paragraph 361, for gaits applies.

376. To form line at closed intervals the captain commands: *At closed intervals,* before giving the prescribed commands for forming line; the company is then formed with 8 yards intervals instead of the normal intervals.

377. To form the mounted men of the section in line. *This will always be done to the left.*

1. *Sections,* 2. *Left front into line,* 3. ***MARCH,*** 4. *Sections **HALT**,* or, 4. ***GUIDE RIGHT.***

In the wire and wagon wireless sections this will be executed as prescribed in paragraph 226, The Soldier Mounted, for forming left front into line from column of fours.

The cart closes up to 4 yards in rear of the right four.

In the pack wireless sections, this will be executed by forming two lines, 4 yards apart, the first being composed of the men not leading mules, the second being composed of the pack mules and their leaders. Each line is formed in a manner similar to that described in paragraph 226, The Soldier Mounted.

To Re-form the Sections in the Normal Formation.

378. 1. *Sections,* 2. *Right by fours,* 3. ***MARCH,*** 4. ***GUIDE RIGHT (LEFT).***

The right four of each section moves straight to the front; the other fours successively oblique to the right front so as to follow the leading four at the proper distance. The cart follows the rear four at 2 yards distance.

Rule 2, paragraph 361, governs the gaits.

To Form the Mounted Men in Column of Twos or Files.

379. 1. *By twos* (or *files),* 2. ***MARCH.***

Executed by each section as indicated in The Soldier Mounted. If in section column, this movement will be a successive one, throughout the column.

To Re-form the Mounted Men in Column of Fours.

380. 1. *Form fours,* 2. ***MARCH.***

Executed by each section in a manner similar to that prescribed in The Soldier Mounted.

To Form Platoon Column From Section Column.

381. 1. *Platoons,* 2. *Right (left) front into line,* 3. ***MARCH.*** The leading section of each platoon moves straight to the front. The rear section executes column half right and then column half left, when by so doing it will have its normal interval from the leading section.

Rule No. 1, paragraph 361, governs the gaits.

To Form Section Column From Platoon Column.

382. 1. *Left (right) by section,* 2. ***MARCH.*** The left sections of the platoons move straight to the front. The right sections execute column half left and then column half right, and follow in the rear of the leading sections.

Rule No. 2 governs the gaits.

Being in Line, to Form Platoon Column, to the Right (or Left).

383. 1. *Platoons,* 2. *Right (left) turn,* 3. ***MARCH,*** 4. ***GUIDE (RIGHT*** or ***LEFT),*** or, 4. *Company,* 5. ***HALT.*** The right section of each platoon executes column right. The other sections increase the gait one degree, preserving their interval from the right section, and take the gait of the latter on arriving abreast of it.

Being in Platoon Column, to Form Line to the Left (or Right).

384. 1. *Platoons,* 2. *Left (right) turn,* 3. ***MARCH,*** 4. ***GUIDE (RIGHT*** or ***LEFT),*** or, 4. *Company,* 5. ***HALT.*** Executed as prescribed in the preceding paragraph.

CHAPTER VI.—THE BATTALION MOUNTED.

Organization and Formation of the Battalion.

385. A field battalion of the Signal Corps may consist of two or three field companies and of the authorized staff and non-commissioned staff. It is commanded by a major.

386. The field staff and noncommissioned staff, etc., of a battalion are as follows:

One major commands the battalion.

One adjutant (captain).

One supply officer, quartermaster, and commissary (captain).

One sergeant major, assistant to adjutant (master signal electrician).

One supply sergeant, assistant to supply officer (first-class sergeant).

Two color sergeants (sergeants).

Three privates, orderlies (one of whom shall be a trumpeter).

387. The normal formations of the battalion are: The *order in line, order in section column,* and *order in platoon column.*

The individual companies are formed as in paragraphs 338–340. In each case the formation of the battalion is analogous thereto.

388. In the *order in line* the interval between companies is twice the interval between sections. The distance between companies in *order in section column* is section distance. The distance between companies in *order in platoon column* is platoon distance.

389. If the battalion is formed in column, with its companies each formed in the order in line, the formation is called a column of companies. The distance between companies is equal to the company front, when at *full distance;* it is section distance when at *closed distance.* When the battalion is in column of companies at closed distances, it is said to be *closed in mass.*

390. At formations of the battalion the companies habitually take their places from right to left in line and from front to rear in column, in the order of rank of their captains.

Companies whose captains are absent take their places in line or column according to the relative rank of the officers present in command of them. A company whose captain is absent for a few days only retains its place, according to the rank of the captain, unless otherwise ordered by the major.

After the formation of the battalion no cognizance is taken of the relative order of the companies. On marches the major ordinarily varies from day to day the relative order of the companies in column.

TO FORM THE BATTALION.

Posts of Individuals.

391. At ceremonies, the major is 30 yards in front of his battalion, opposite the center. On other occasions he places himself where he can most readily observe and direct his battalion. The commissioned staff is posted 2 yards in rear of the major, in order of rank from right to left; the noncommissioned staff and the trumpeter, similarly formed, 2 yards in rear of the commissioned staff.

392. To form the battalion in line, the adjutant causes adjutant's call to be sounded; the adjutant and sergeant major proceed to the selected ground and post themselves facing each other a few yards outside the points where the right and left of the right company of the battalion are to rest.

The companies approach the line from the rear and are posted in succession from right to left by their captains, so that the front rank will be on the line established by the adjutant and sergeant major. After halting his company, each captain aligns it toward the right, as prescribed in paragraph 362.

The battalion in line is formed on the same principle as the company, in the line the interval between companies being 6 yards.

When the company that arrives first on the line has been established, the sergeant major joins the battalion noncommissioned staff.

The line being formed, the major and his staff take post, facing the center of the battalion. The adjutant then moves at a trot or gallop by the shortest line to a point midway between the major and the center of the battalion, halts, facing the major, salutes with the right hand, and reports: ***Sir, the battalion is formed.***

The major returns the salute with the right hand.

The adjutant then takes his post with the battalion staff.

393. The battalion may also be assembled in any other convenient formation. In such cases, as soon as the last company has taken its place the adjutant joins the major and reports to him that the battalion is formed.

394. Officers draw and return saber with the major. At ceremonies, sabers are habitually drawn; at other times, they are drawn or kept in the scabbard at the discretion of the major.

395. *To align the battalion.*—To effect a general alignment the major causes one of the flank companies to be established in the desired position, and commands: 1. *By company*, 2. *Right (left)*, 3. ***DRESS***.

Each captain in turn, commencing with the company first posted, aligns his company toward the flank designated, and commands *front* when the alignment is complete.

The captain of the company first established superintends the alignment from the flank of his company nearest the point of rest. The captains of the other companies superintend the alignment from the flank of their companies farthest from the point of rest.

396. *To dismiss the battalion.*—The major commands: *Dismiss your companies*, or sends appropriate instructions to the captains. Each captain marches his company to its park and dismisses it.

Maneuvers of the Battalion.

397. Formal maneuvers of the battalion are of limited application.

For passing from one formation to another, and for the simple evolutions requisite for ceremonies and the ordinary incidents of service, the battalion is maneuvered in accordance with the principles heretofore prescribed for a single company and by similar commands. In the case of simultaneous movements, such as marching to the front, to the flank, to the rear, obliquely, etc., the command or signal of execution of the major is immediately repeated by the captains and simultaneously executed by the companies. In the case of successive movements, the captains maneuver their companies so as to cause them to assume their proper positions by the shortest route and in conformity with the principles of the rules of gaits.

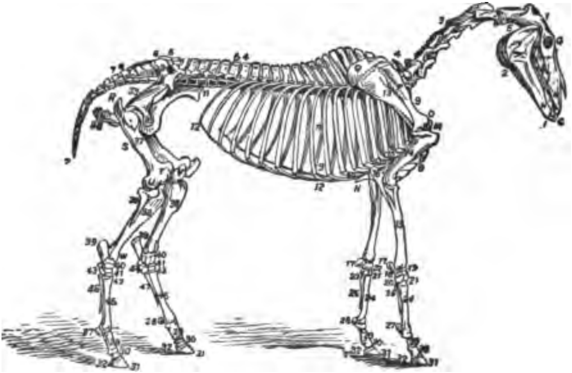
398. The commands of the major are transmitted by orderlies or given by arm, saber, or trumpet signals, or by word of mouth. The captains habitually repeat the commands of the major, or give such commands as may be necessary to insure the execution of the movement. Their commands are given by arm or saber signal, or by word of mouth. The whistle, and not the trumpet, is habitually used to attract attention to the signals of the captain during the evolutions of the battalion.

PART IV.

CARE OF ANIMALS, STABLE DUTY, ETC.

CHAPTER I.—TRAINING OF HORSES.

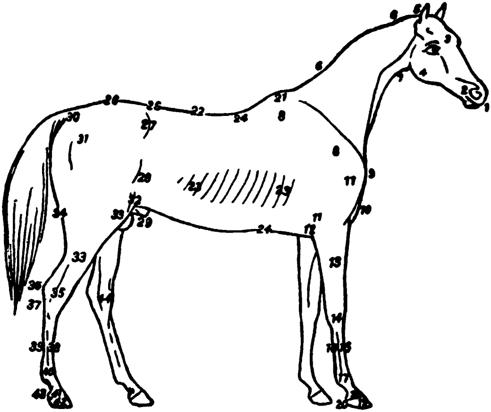
399. *Skeleton of the Horse.*



Pl. 19, Par. 399.

A, Molar teeth.
B H, Canine or tush.
C I, Incisors.
E, Atlas.
G, Orbit.
M, Cariniform cartilage.
N, Ensiform cartilage.
O, Coracoid process of scapula.
P, Spine.
Q, Cartilage.
R, Trochanter major.
S, Subtrochanterian crest.
T, Trochlea.
U, External condyle.
V, Patella.
W, Hock joint.
1, Cranium.
2, Lower jaw.
3, Cervical vertebræ.
4, 4, Dorsal vertebræ.
5, 5, Lumbar vertebræ.
6, 6, Sacrum.
7, 7, Coccygeal vertebræ.
8, Sternum.
9, 9, True ribs.
10, 10, Cartilages of true ribs.
11, 11, False ribs.
12, 12, Cartilages of false ribs.
13, Scapula.
14, Humerus.
15, Radius.
16, Elbow.
17, Os pisiforme.
18, 19, 20, 21, 22, 23, Carpal bones.
24, Large metacarpal bone.
25, Outer small metacarpal bone.
26, Inner small metacarpal bone.
27, 28, Sesamoid bones.
29, Os suffraginis.
30, Os coronæ.
31, Os pedis.
32, Wing of the pedal bone.
33, 34, 35, 36, Os innominatum.
37, Femur.
38, Tibia.
39, Os calcis.
40, Astragalus.
41, 42, 43, 44, Tarsal bones.
45, Large metatarsal bone.
46, Outer small metatarsal bone.
47, Inner small metatarsal bone.

400. *Points of the Horse.*



Pl. 20, Par. 400.

Head.

1, Muzzle.
2, Nostril.
3, Forehead.
4, Jaw.
5, Poll.

Neck.

6, 6, Crest.
7, Throttle or windpipe.

Fore quarter.

8, 8, Shoulder blade.
9, Point of shoulder.
10, Bosom or breast.
11, 11, True arm.
12, Elbow.
13, Fore arm (arm).
14, Knee.
15, Cannon bone.
16, Back sinew.
17, Fetlock or pastern joint.
18, Coronet.
19, Hoof or foot.
20, Heel.

Body or Middle piece.

21, Withers.
22, Back.
23, 23, Ribs (forming together the barrel or chest).
24, 24, The circumference of the chest at this point, called the girth.
25, The loins.
26, The croup.
27, The hip.
28, The flank.
29, Sheath.
30, The root of the dock or tail.

Hind quarter.

31, The hip joint, round, or whirl bone.
32, The stifle joint.
33, 33, Lower thigh or gaskin.
34, The quarters.
35, The hock.
36, The point of the hock.
37, The curb place.
38, The cannon bone.
39, The back sinew.
40, Pastern or fetlock joint.
41, Coronet.
42, Hoof or foot.
43, Heel.
44, Spavin place.

401. Signal Corps officers should make themselves thoroughly acquainted with the natural history and structure of the horse, and what effects different modes of treatment, changes of diet, etc., have on his system and powers of endurance. An officer deficient in such knowledge will either have his company constantly lacking in efficiency and reliability, or else make it necessary to expend a large amount to keep him supplied with remounts. Officers should also make themselves acquainted with the best methods of breaking and training horses.

All Signal Corps officers should be familiar with the diseases that are commonly met with in horses; they should know their symptoms, mode of treatment, what to do in emergencies, and have a good knowledge of the effects produced by the medicines supplied to the company.

It is the duty of the company commander to instruct his officers in these things, as they are a very important part of the knowledge that should be possessed by every Signal Corps officer.

402. The horse is considered as an animal of a single idea, and that he has no reasoning faculties beyond the limits of his experience, and consequently we reason with him by acts alone, his natural movement being away from that which hurts him or excites his fear. Early impressions are seldom forgotten, and it is important that each move be correctly begun. In familiarizing him with objects that excite his fear, the horse should be allowed to smell or touch them with his nostrils, for in a certain sense they are to him what the fingers are to man.

Invariable rules can not be laid down for the proper training of all horses, as it will be found that each horse requires special treatment.

403. Horses are trained by the best horsemen, under the supervision of an officer or noncommissioned officer; and the men employed in this part of the horse's education are selected for their natural fondness for animals as well as for their patience, coolness, and intelligence.

The horse is made gentle and obedient, and his powers and qualities are best developed by patience, kindness, encouragement, and fearlessness; punishment is resorted to only when necessary, and then only administered after the commission of the offense, that he may know why he is punished. No punishment should ever be administered to the horse in anger. Under harsh treatment he will become timid, then sullen, and at length violent and unmanageable.

Restlessness and impatience frequently arise from exuberance of spirits or playfulness, which must be carefully distinguished from that which arises from viciousness and timidity. When restless, the horse should be handled quietly until he becomes calm; when submissive after punishment, he should be treated kindly.

As one horse is apt to be governed by the actions of another, trained horses that are indifferent to such sounds should be interspersed among the new ones when accustoming them to firing, beating of drums, etc.

The first object to be attained in training the horse is to gain his confidence and render him gentle and tractable. For this purpose, all proper means must be employed, such as feeding, handling, patting him, taking up his feet, etc., and the practice of the longe.

When the horse will quietly allow his feet to be handled and lifted, the man should practice gently tapping them to accustom him to the action of shoeing.

The man must endeavor to discover the horse's natural inclinations and to gain a knowledge of his abilities, that he may know how to take advantage of these qualities.

Every action of the man should tend to induce full confidence that no harm is intended and nothing but kind treatment is to be expected.

When new horses are first placed in stalls, the men approach them quietly, and always take care to speak to them before entering the stall; they should be carefully fed and gradually accustomed to the Government forage ration; as many of them will be entirely unused to eating oats, corn, or barley, great care must be taken or serious trouble may follow. By commencing with the coarser part of the ration, consisting of hay and bran, and, where possible, crushing or grinding the grain, the horse will gradually be brought to the habit of eating the service ration without injury.

From their arrival, the horses should be exercised one or two hours daily in the open air. For this purpose the new horse will be equipped with the halter only, and led by the man mounted on a trained horse. After a few days, a bit may be placed in the young horse's mouth, and the reins tied loosely and thrown over his neck.

Bridling.

404. A plain snaffle bridle should at first be used and put in with care and gentleness. If the horse resists, no violence should be used. He should be turned round in his stall and the instructor should take the end of the halter while the man quiets and encourages the horse. By careful treatment he will soon become accustomed to the sight of the bit and will allow it to be placed in his mouth. The reins will be tied so as to hang loosely on the neck.

The Cavesson and Longeing.

405. The *cavesson* is a light halter with the brow band, throatlatch, and cheek pieces like the bridle headstall, and has a noseband that may be adjusted with a buckle; there is also a running ring on the chin strap for the longe. The longeing strap is from 20 to 30 feet long. The lariat may be used.

The cavesson is put on after the shaffle has been fitted; the noseband should be placed about 3 inches above the nostrils, so as to not affect the breathing; it should act both as a noseband and curb, and be over the snaffle. It must not be buckled so tightly as to make the horse uneasy.

The first lesson to be taught a young horse is to go forward. Until he does this freely, nothing else should be required of him.

The practice of the longe is to supple and teach the horse the free and proper use of his legs. It thus aids in forming his gaits and in fitting him for the mounted service.

The lesson should be begun on a circle from 15 to 20 feet in diameter. As horses are usually fed, watered, saddled, and led from the near side, they are inclined to lead better from that than the off side. It will therefore generally be found necessary to give two lessons on the right to one on the left.

If a horse hesitates or stands still when he is ordered to move on, he should be encouraged, as such hesitation oftener comes from fear or ignorance as to what is required of him than from obstinacy or other vice.

The horse is first led several times around the circle at a walk. A man with a whip follows at a short distance and shows the whip occasionally when the horse hangs back; if this does not produce the desired effect, he should strike the ground in rear of the horse or touch him lightly with the whip until he obeys. When he moves freely at the walk, the man holding the longe should gently urge him to trot, and gradually lengthen the rein so that the horse may scarcely notice it; he should continue to go round the circle at an active pace, nearly opposite the horse's shoulder, so as to keep him out and urge him forward.

If the horse takes kindly to this lesson, the man holding the longe may lengthen it by degrees until he has only to turn in the same spot, the man with the whip being careful to keep the horse out of the line of the circle.

When the horse breaks his pace or plunges, the rein should be shaken horizontally without jerking until he returns to the trot.

The man holding the longeing rein should have a light and easy hand. For the first two or three days the horse must not be urged too much; if he goes gently, without jumping or resisting, enough is accomplished. He should be longed to the right, left, and right again, changing from the trot to the walk and back again in each case. He should be frequently halted by gently feeling the rein and speaking to him; and at the conclusion of each lesson the rein should be carefully shortened and gathered up in the hand, and the horse brought to the center of the circle and caressed before being dismissed.

After a few days of the above practice, the horse may be urged a little more in the trot, but great care is requisite to teach him to use his limbs without straining them. Much harm may be done in this instruction by a sudden jerk or a too forcible pull on the longe.

Care must be taken that the lessons are not made so long as to fatigue or fret the horse, being gradually increased in length as the instruction progresses. The man holding the longeing rein should take it short in one hand, at the same time patting and rubbing the horse about the head and neck with the other; he should then try to bend the horse's neck a little to the right and to the left by means of the longeing rein; the bend should be in the very poll of the neck, and should be cautiously repeated at the end of each lesson until the horse responds easily; this will greatly facilitate the future instruction. The longe is used to instruct the new horses, especially if timid, to jump the bar and ditch.

406. The *running rein* is of great value in teaching a horse to keep his head in a proper position, and affords valuable aid in his first handling. If judiciously used, it saves the rider a great deal of trouble and the horse much ill-usage, and simplifies the subject of "bits and bitting." It is especially useful in controlling horses that are inclined to bolt.

It should act directly on the snaffle bit itself, and is wholly independent of the reins.

The running rein consists of three parts—the chin strap, rein, and martingale.

The *chin strap,* about 6 to 8 inches long, on which is suspended a loose ring, is fastened to both snaffle-bit rings.

The *martingale* has only one ring; the loop through which the girth passes is made adjustable by a buckle. The martingale is so adjusted that when taut the ring will be on a level with the points of the horse's shoulders.

The *rein* is about 8½ feet long; one end is buckled into the near pommel ring; the free end is then passed through the martingale ring from rear to front, thence through the chin-strap ring from left to right, thence through the martingale ring from front to rear and is held in the rider's right hand.

A pull on this rein will act directly on the mouthpiece, drawing it back and somewhat downward toward the horse's breastbone.

407. Before commencing the bending lessons, it is well to give the horse a preparatory one in obedience to make him sensible of the power man has over him. This first act of submission will prove of great service, and gives the man such ascendency as to prevent the horse at the outset from resisting the means employed to bring him under control.

Go up to the horse, pat him on the neck, and speak to him; then take the reins off the horse's neck and hold them at a few inches from the rings of the bit with the left hand; take such position as to offer as much resistance as possible to the horse, should he attempt to break away; hold the whip in the right hand, with the point down; raise the whip quietly and tap the horse on the breast; the horse naturally tries to move back to avoid the whip; follow the horse, at the same time pulling against him, and continuing the use of the whip; be careful to show no sign of anger nor of yielding. The horse, tired of trying ineffectually to avoid the whip soon ceases to pull, and moves forward; then drop the point of the whip and make much of him. This repeated once or twice usually proves sufficient. The horse, having found how to avoid the punishment, no longer waits for the application of the whip, but anticipates it by moving up at a gesture.

408. *Bending lessons* should be given each day, so long as the snaffle bit is used alone; but the exercise should be varied, so that the horse may not become fatigued or disgusted.

The horse's balance and his lightness in hand depend on the proper carriage of his head and neck.

A young horse usually tries to resist the bit, either by bending his neck to one side, by setting his jaw against the bit, or by carrying his nose too high or too low.

The bending lessons serve to make the horse conform to the movements of the reins, and yield to the pressure of the bit. During the lessons, the horse must never be hurried.

409. *To bend to the right.*—Take a position on the near side of the horse in front of his shoulder and facing toward his neck; take the off rein close against the bit in the right hand, the near rein in the same way in the left hand, the thumbs toward each other, the little fingers outward; bring the right hand toward the body, and at the same time extend the left arm so as to turn the horse's head to the right.

The force employed must be gradual and proportioned to the resistance met with, and care must be taken not to bring the horse's nose too close to his chest. If the horse moves backward, continue the pressure until, finding it impossible to avoid the restraint imposed by the bit, he stands still and yields to it.

When the bend is complete, the horse holds his head without any restraint and champs the bit; then make much of him and let him resume his natural position by degrees, without throwing his head around hurriedly.

A horse, as a rule, champs the bit when he ceases to resist.

The horse's neck is bent to the left in a similar manner, the man standing on the off side.

410. *To arch the neck.*—Being on the near side of the horse: Cross the reins behind the horse's jaw, taking the near rein the right hand, the off rein in the left, at about 6 inches from the rings, and draw them across each other till the horse gives way to the pressure and brings his nose in. Prevent the horse from raising his head by lowering the hands. When the horse gives way to the cross pressure of the reins, ease the hand and make much of him.

411. *To lower the head.*—Being mounted: Take the right rein in the right hand, the left rein in the left, and feel lightly the mouth of the horse; then, holding the hands low, play with the bit, gently drawing in the reins as the horse drops his nose. When the horse, opening his mouth, yields the lower jaw to the bit and brings in his head so that the face is vertical, release the tension of the reins and caress the horse for his obedience. By degrees the horse can be taught to depress the head to any extent.

412. *To elevate the head.*—Being mounted: Hold the reins separately, as prescribed above, and with arms extended forward, make light pulls upward upon the reins; when the horse has obeyed, lower the hands so that the horse can lower his muzzle, and then quietly demand that the face of the animal shall be brought into the vertical position.

413. *To carry the head to the right.*—Being mounted: Hold the reins as previously prescribed, and drawing the right rein toward the body, carry the head of the horse a little to the right, using the left hand to measure the effect of the right, to keep the face of the horse vertical, and to aid in keeping the jaw pliant. The rider should be satisfied with slow progress, but in time the head should be brought round so that the face, with the nose down, shall look to the rear. By this exercise the head and neck are suppled and made submissive. After the head has been carried to the right, the left hand, supported by the right, will carry the head to the front, and the vertical position of the head be demanded by a play of both reins. In a similar manner the head will be carried to the left.

414. After the horse has submitted quietly to this instruction, he will be required to move forward.

For this purpose the rider takes the snaffle rein in each hand and feels lightly the horse's mouth; the man with the longe leads the horse forward and longes him first to the left and then to the right, at a walk; if the horse shows any disposition to kick or plunge, the longe is shaken lightly to engage his attention.

After a short lesson the rider dismounts, the horse is petted and dismissed.

These lessons are continued until the horse can be made to go forward, to the right and left, to halt, and rein back by application of the aids.

Breaking in the Young Horse to Harness.

415. The harness should be put on the horse in the stable with caution, and at first without traces, so that in the event of the horse jumping about they will not hang around his legs and frighten him. The horse should then be fed in his harness, and after standing for some hours, be walked about in it.

When the horse has thus been fed and walked about and has become reconciled to the harness, the traces should be attached and a rope tied to the rear end of each; a man then takes the ends of the ropes and the horse is walked about, the man holding the ropes taking care that the traces do not rub against the sides of the horse in the beginning, but accustom him to them gradually.

When the horse has become accustomed to the pressure of the collar and traces he may be then hitched in with a steady horse. At first the utmost caution should be observed, and a foreleg held up, if necessary, while the traces are being fastened, and no noise or shouting should be permitted. After being hitched in, the horse should be permitted to stand still for some minutes before the carriage is started, and it should be put in motion by the other horses. The horse should be left to himself and not be required to draw at first; all that should be demanded of him is to move forward quietly.

To Accustom the Horse to the Report of Firearms.

416. This part of the horse's education should not be commenced until he has become so familiar with the bridle, etc., that he makes no resistance when they are applied. He is then shown the pistol, allowed to smell it, made familiar with the sound of the cocking and the falling of the hammer, the man at the same time talking to and caressing him to allay his fears. A blank cartridge is fired some distance from him. The horse will be startled, but his fears will be dispelled by kind words and caresses. The horse's fears having been quieted, other shots will be fired nearer and nearer to him, observing the same caution.

Great care should be exercised that the pistol be not discharged too near the horse's ears, nor so close to him that the powder will burn him; a horse once injured in this way will nearly always be nervous while firing is going on.

This lesson is repeated several times, until the horse no longer flinches materially, nor struggles after a shot is fired.

417. Horses that shy, etc., may be treated in this way: Tie a rope with a slipknot around the body over the loins, the knot under the belly; the free end of the rope is passed under the horse between his forelegs and carried up through the halter ring and made fast to a suspended rope, sustained in place by guy ropes to prevent too much lateral motion.

The horse being thus secured, such articles as robes, blankets, etc., of which he may have shown fear, are brought into his sight, and he is encouraged to smell or touch them. Pistol firing, etc., is practiced until he ceases to show signs of alarm.

The object in having a rope suspended is to prevent the horse from hurting himself and yet allow him freedom to move his haunches. The picket rope, if high enough, will do.

To Break the Horse of Kicking.

418. The horse is thrown and one end of each of two long straps is made fast to the bit rings; the other ends are passed through rings on the leather surcingle and secured to the hind pasterns. When thus secured, all means should be resorted to in order to make the horse kick, and this should be repeated until he no longer struggles nor attempts to move his hind legs under any provocation whatever.

Swimming Horses and Fording.

419. As it is often necessary for mounted troops to cross streams by swimming, the exercise is important, as it gives confidence to men and horses.

The horses are at first equipped with the watering bridle and are barebacked. The reins are on the horse's neck just in front of the withers and knotted so that they will not hang low enough to entangle the horse's feet, care being taken to have them so placed as to permit the horse to push his nose well out and to have entire freedom of the head. The horse should be watered, but not too freely, before entering him into the stream.

The man mounts, rides into the stream, and when he gets into deep water, drops reins, seizes a lock of the mane with the upstream hand, allows his body to drift off quietly to the downstream side of the horse, and floats or swims flat on the water, guiding the horse, when necessary, by splashing water against his head, only using the reins when the splashing fails. When the horse touches bottom at the landing, the man pulls himself on the horse's back and takes the reins. The horse is easily controlled when swimming; he is also easily confused. It is therefore necessary that the man should be gentle and deliberate. The man must be cautioned that pulling on the reins is apt to pull the horse over backward, and that when the horse touches bottom he may begin to plunge.

The man will also be required to swim holding the horse's tail, the horse towing him.

After the man and horse have gained confidence, the man will be required to be seated on his horse, with or without saddle, while swimming. The man's weight presses the horse down and impedes his movements, and when saddled the man should hold the knees well up to lessen the resistance, and steady his seat by holding on the mane or the pommel of the saddle.

With some horses, especially those that swim low, it is advisable that the man sit behind the saddle to allow the forequarters to float high.

The men will also be practiced in swimming the horses when fully armed and equipped. The stirrups are crossed and secured. The horse is guided by the reins. The men are instructed in crossing swift-running water to keep their eyes fixed on the opposite bank.

When large, swift rivers are to be crossed, too hazardous for all the horses to be ridden, the bridle reins are secured to avoid the danger of their being caught by the horse's feet, or by those of another horse swimming close to him; the stirrups are crossed and secured; a trained horse is selected for a leader and is ridden without saddle; all the horses are led or driven to the approach and can generally be made to take the water without much difficulty. The approach should be selected at some distance above the landing. If practicable, a few horses should be taken over and placed at the landing, and some men stationed to receive the horses as they land.

If there be a pontoon bridge in the immediate vicinity, the crossing should be below it.

When a horse is towed or led from a boat, he should be held astern of the oars and on the downstream side or in the wake.

When a stream with a treacherous bottom is to be forded, stakes or bushes should be placed so as to mark the limits of the ford, or may be placed so as to mark the dangerous places only.

When the stream is to be forded at night, lighted lanterns should be fastened to the stakes and one displayed at the landing or a fire built there.

When the stream has a swift current and the water is above the horses bellies, the subdivisions should cross with as wide a front as practicable, to permit a freer flow or prevent damming of the water, which might carry a horse off his feet; but in crossing a dangerous ford, the column of twos is less objectionable than the column of fours.

Mounted troops should generally cross streams above infantry or so far below that the water will not be dammed against them.

CHAPTER II.—DRAFT ANIMALS.

Care of Draft Animals in the Field.

420. Constant and intelligent supervision of adjustment of the bearing parts of harness, packs, and saddles is productive of better results than medication in keeping transportation animals in serviceable condition.

421. In preparing for the field it is well to bear in mind that nearly all animals in a command lose flesh rapidly for the first 10 days of a march, and that during this period the adjustment of all parts of the harness, more especially the collars, should be given close attention.

422. If the march should happen to be a continuous and a severe one, it may be noticed that about the sixteenth day, draft animals appear suddenly to become very lean in the muscles of the shoulders, back, abdomen, and croup. If a fair amount of forage is available they quickly improve to a certain point, where they remain stationary and continue to do hard work without noticeable change under an intelligent system of watering and feeding. They are now in working condition.

423. ***Water*** on the march whenever a good opportunity to do so presents itself, never forgetting, however, that a warm animal should be watered but sparingly, and that such a watered animal should not be allowed to remain stationary even for a few minutes, as this induces laminitis (founder), due to contraction of the internal blood vessels by the cold water taken and the consequent increase of blood pressure in the legs and feet where it can not, while the animal is inactive, be taken care of by the system. Laminitis (founder) is due to congestion of the feet.

424. ***Feeding.***—Soon after reaching camp, offer a little hay. Water before feeding grain when possible. Offer grain immediately after watering, and then place before the animals what remains of the hay for that day. The morning watering must of necessity be governed by circumstances. If absolutely sure of water on the road, say one hour after breaking camp, it would be a needless waste of time and energy to water immediately before or after the morning feed on the line.

425. ***Midday baiting.***—As little as 1 pound of grain per animal, taken for the daily allowance and given in charge to each driver, fed at the noon halt, will have a wonderful effect for good on the animals of a command. At this halt the careful driver will add a few handfuls of grass, and at the same time look over his collars and breeching with a view to their readjustment.

426. ***Collars*** of steel, such as those furnished to artillery commands, are preferable to leather for military use, when properly adjusted and cleaned. When improperly adjusted they are inferior to the leather article. Steel collars are adjusted by means of bolts and plates. Leather collars by means of top straps and hames. When these methods will not produce the desired results, the use of collar pads must be resorted to. Felt collar pads are not desirable, as they soon become stiff and hard.

A collar should fit snugly to the sides of the neck without compressing it, and its bearing surface should rest squarely on the bed of muscles situated on the front of the shoulder. When in position there should be a space between its lower part and the windpipe sufficiently large to comfortably admit the insertion of the open hand, back up, as far as the wrist.

All collars should be furnished with a neck plate of zinc, for the protection of the top of the neck against rubbing.

To prevent blistering of the top of the neck on hot, sunny days, it will be found that a wet sponge or a wet piece of folded gunny sack, properly secured to the top of the collar and wetted at intervals, is effective.

The bearing surface of steel collars and neck plates should be washed carefully soon after making camp. They should never be scoured with sand or rubbed with an abrasive substance, for the reason that the steel beneath the zinc plating may be thus exposed. The exposed steel rusts quickly, pits rapidly from the action of the acid sweat, and acts as a rasp would on the soft tissues with which it comes in continual contact.

The bearing surface of leather collars should not be scraped unless considered absolutely necessary to remove accumulated dirt due to negligence. If scraped they should be boned smooth and then slightly oiled. Leather collars may be easily cleaned with a damp sponge. They should be thus cleaned each evening. A careful man will not let his collars remain on the ground over night, but will hang them on the pole, or put them in some safe place where he will protect them from the rain and the dust of the camp.

427. ***Necks and shoulders.***—On arrival in camp let collars remain in position for about 15 minutes. Their weight on the hot, tender skin affords sufficient pressure to prevent the formation of swellings so often observed after the collar is suddenly removed. Normal circulation will establish itself gradually under collar pressure alone, and the skin of the shoulders and neck will regain its tone and elasticity.

After removal of the collar, bathe the shoulder and neck with clean water; this to remove sand and dust that would otherwise remain in the hair, where it may not be reached by the horse brush.

Salty water, or a weak solution of vinegar in water, when applied to the shoulders and neck, acts as a tonic to the jaded skin.

Animals with narrow, lean shoulders should not be placed in the collar. For these, if they must be harnessed, a breast strap (Dutch collar) should be used.

When putting on a collar, see that the mane hangs naturally beneath the neck plate. If the collar is a steel one, be careful when snapping it in place that the skin of the upper part of neck is not pinched between the neck plate and the collar itself.

If swellings appear on the shoulders, use massage to remove them and in addition apply a cold-water pack during the night; a wet sack properly adjusted and held in place will answer the purpose. If a gall appears, do not grease it. Wash it with water and soap, dry thoroughly, and apply a weak solution of alum (one-half ounce to a pint of water) or a solution of aloes in water (one-half ounce to the pint). If the animal must be worked, use a chambered (cut-out) pad over the spot to remove pressure. Greasy ointments serve as a trap for dust and sand.

428. ***Traces.***—Verify the length of traces frequently. Do not depend on the chain links as a guide in hitching. Leather traces stretch considerably in wet weather. A difference of half an inch in the length of traces will cause trouble on the shoulder of the shorter side. It is also liable to produce lameness due to irritation of extensor muscles. If the point of attachment of the trace to the collar should be too high, it will cause a downward pull on top of neck, with its consequent irritation. If too low, it will cause the collar to "ride," and nearly all the pressure will be on the point of the shoulders and on the windpipe.

The number of sore-shouldered draft animals in a command on the march is an excellent standard by which to judge the horsemanship of the personnel.

429. ***Breeching.***—The breeching should be fairly loose; otherwise it is liable to chafe the quarters and to interfere with the free play of the muscles. It should be taken up as the animals become thin.

Martingales should not fit too snugly, as they are very liable to chafe the soft, thin skin of the under part of the body.

430. ***Yoke straps*** should be adjusted with a view to the height of the pair. They should never be permitted to trespass on the bearing surface of the collars.

431. ***Backstraps*** should be so adjusted as not to let the saddles ride the withers, but at the same time there should not be sufficient strain on them to cause the crupper to irritate the under part of the tail.

432. ***Bellybands and cinchas*** should never be unduly tightened, as they cause cinch sores near the elbow, and quarter-strap sores beneath the ring shields.

When a cinch gall appears, remove the cause, keep the place clean, and apply a solution of aloes or alum in water. Either of these will stimulate the gall and deter insects from alighting on the wound.

433. ***Bearing reins*** should be of such a length that the animals may have free use of the muscles of head and neck. Bearing reins are not a necessity.

434. A driving bit should be smooth and jointed. It should be so adjusted that it will not lift the corners of the mouth. If placed too high in the mouth, the animal uses his molar teeth to press against it, and gains for himself the reputation of a hard-mouthed puller.

435. Beware of thread ends in collar pads and of knots in headstalls, throatlatches, bellybands, cinchas, and surcingles, and be careful that buckles are not turned toward the skin. These readily produce irritations and abrasions, and are plain evidence of negligence and carelessness on the part of the rider or driver, as well as loose supervision on the part of those superior in rank.

436. To keep his animals in the collar and off the lead line should be the aim of each driver. This can be accomplished with little trouble, barring accidents, if the harness is kept in proper shape and fit, and necks and shoulders are kept clean.

CHAPTER III.—DRIVING.

Double Harness.

437. Double harness is fitted exactly the same way as single, except that the bellybands should be slightly looser.

438. Never pole too tightly, especially when the pole is a heavy one, because if the pole chains are tight the weight of the pole will continually rest on the neck. On the other hand, if the poling up is too lose the constant swaying will be a source of irritation and danger to the team.

Coupling Reins.

439. The correct adjustment of the two short inside reins, called coupling reins, requires great care. They should be so fitted that an even pressure is brought to bear on both sides of the animals' mouths, and in such a way also that both animals shall go straight and pull evenly on the traces For instance, if the near horse carries his head to the near side, the coupling rein on the off side should be taken up, when his head will be straightened.

Supposing we have two animals apparently well matched, but that the near one carries his head rather out to the front, and has a light mouth, while the off animal has a hard mouth, and carries his head close to his chest. Now to get this pair to pull equally on the traces we must have the near animal's rein considerably longer than those of the off animal. In this case we should begin by letting out the off side coupling rein and taking up the near side rein the same number of holes.

The reins will now be adjusted so as to permit the near horse to hold his head well in front of the other, while the collars are brought level.

The most general fault is coupling up both reins too tightly, which makes the animals carry their heads in toward the pole, instead of going straight, as they should do. To prevent animals acquiring this habit, it is a good plan to change their positions occasionally, instead of always driving them on the same side of the pole.

It is a convenient plan to have more than one hole in the billets for buckling the reins on the bits, so that an animal can be pulled back or let out a hole or two on either side without altering the coupling rein.

Holding the Reins.

440. Place both reins in the left hand, the near rein over the forefinger and the off rein under the middle finger. Thus you have two fingers between the reins. The reason for this is that it gives much more scope for play of the wrist on the mouths than if you only have one finger between the reins. The thumb should point straight to the right, and the forefinger be held well out, pointing to the right rear. This will keep the rein close up to the knuckle, and the pair may be easily moved across the road by turning the back of hand up or down; up for left turn, down for right turn.

441. Sit firmly but comfortably in your seat, body, erect, without stiffness, and elbows close to side. Do not lean forward. Now take the whip in the right hand, at the place where it balances comfortably, and you are ready to start.

442. Bring the pair to attention by feeling their mouths gently, and speak to them. If they do not respond, touch them gently with the whip.

The moment they start drop the hand slightly; "jibbing" is often caused by neglect of this precaution.

443. The elbows should be held close to the sides, with the points almost touching the hips.

The wrist should be well bent, as by this means the driver is enabled to keep a perfectly steady bearing on the mouths without any jerking.

The forearms should be horizontal, and the fingers from 3 to 5 inches from the center of the body, with the knuckles to the front.

The thumb should not be pressed down on the rein. The fingers that should grip the reins are the three lower ones.

444. Never hit an animal while the right hand is holding a rein, because if you try to cut him when you have the off rein in the right hand, you must slack that rein off, and the pair is apt to dash to the left.

445. Do not get into the habit of "jabbing" the pair with the bits, and do not flap the reins on their backs to start them or make them increase their pace.

Drive at a steady, even pace, as nothing tires a team so much as to constantly change the rate of speed.

When it is necessary to pull up in a hurry the proper course to pursue is to catch hold of the reins with the finger and thumb of the right hand, just behind the left, and shorten them as much as necessary by pulling them through. This is safer and more businesslike than elevating the hands, which disturbs the seat.

446. The driving gloves should be large and very comfortable. They should never be of a size to cramp the hand in the slightest.

447. The right hand is known as the whip hand. It is generally used only for holding the whip, for assisting the left hand, and for shortening the reins by pulling them through from behind the rein hand.

Driving Four-in-Hand.

448. The driving of four animals as they should be driven is an art that can only be learned by constant practice and study.

449. When driving, the body should be kept upright and square to the front, but all stiffness should be avoided. The driving seat should be about 3 or 4 inches higher at the back than in front, so that the driver can sit well back in a really comfortable position. The ankles and knees should be just touching each other, and the arms close to the sides. The forearm should be about horizontal, and the left hand, as in driving a pair, from 4 to 5 inches from the center of the body, the back of the hand being turned toward the front, but inclined a little toward the team. The wrist should be bent slightly toward the body, and on no account allowed to bend the other way. This is far the best position for feeling the mouths, as the wrist then acts like a spring, and an even pressure can be maintained.

The driver should on no account be half standing, or merely leaning against the seat, with unbent knees, as, in the event of a wheeler falling or shying to the side, he will probably be jerked off the wagon.

The Reins.

450. The best way of holding the reins is to have the near lead over the left forefinger, the off lead between the forefinger and the middle finger, the near wheel between the same and under the off lead, and the off wheel between the middle and third finger. The reins must be gripped firmly by the three lower fingers of the left hand. The thumb should point to the right, and the forefinger be held well out. The near lead-rein should pass over or close to the knuckle of the forefinger and not over the first or second joint.

Adjusting the Reins.

451. All four reins can be shortened, if much is required, by pulling them through from behind, but it is generally quicker and neater to hold the reins with right hand 2 or 3 inches in front of left (the little and third fingers over the off-side reins and the middle finger between the near-side reins), and then slide the left hand up to the right. This movement is generally required when going down hill.

Wheel Reins.

452. It is better to shorten these by pulling them through from behind. This is necessary when going down hill, especially when the wheelers are loosely poled up, so as to prevent the singletrees from hitting the leaders' hind legs.

Lead Reins.

453. In order to shorten these, take out both the leaders with the right hand (the third and little fingers over off, and first or middle finger over near-side rein); they then can be passed back to the left hand the required length by letting them slip through the right hand the necessary amount. To lengthen them, simply pull them through from the front.

Near-Lead Rein.

Either push through from the front, with the full of the right hand over the rein, or take it right out of left hand and replace it the proper length.

Off-Lead Rein.

Push it through from the front.

Near-Wheel Rein.

This is the most difficult rein to keep in its right place and to shorten. It is constantly slipping when the wheelers pull. It appears to be the best plan to pull it through from behind.

Off-Wheel Rein.

Push it through from the front with the right hand.

Crossing the Road.

454. *To the left:* Turn the left hand, knuckles upward, and pass it across the body from left to right; the team will incline to the left, the reins on that side being shorter.

To the right: Pass the left hand down toward the left hip, back of the hand to the front, with the knuckles of the forefinger downward, and that of the little finger uppermost. This shortens the right-hand reins and causes the team to incline in that direction. The whip can be applied to the off wheeler in the first instance, or to the near one in the second, if they do not cross rapidly enough.

Turning to the Left.

455. With the right hand seize the near-lead and wheel reins under the lower fingers; then either pull those reins up toward the center of the body, which will shorten them, or allow the left hand to go slightly to the front, which will slack off the right reins, or, better still, combine these motions.

Turning to the Right.

456. Take hold of the off-lead and wheel reins with the lower fingers of the right hand and treat them in the same way as in using the left reins.

To Steady the Team.

457. In order to steady the animals or to ease the left hand, the right may be placed in front of the other over all the four reins, the third and little fingers being over the off reins and the upper fingers over only one of the near reins.

The Whip.

458. The handle should rest in the palm of the right hand and be kept firmly in its place by the action of the thumb

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pressing against the base of the forefinger; the lower fingers will then be left free to catch hold of the reins.

If, however, it is necessary to pull the reins through from behind, the lower fingers must be tightened on the handle, so as to allow the thumb and forefinger to be used.

Hold the whip at an angle of about 30° to the left front and about 40° upward.

The thong ought to have three or four turns round the handle.

The point of the thong should be just under the inside of the thumb; this will keep it from slipping. Hold the whip where it will balance comfortably, the end of handle under the forearm, the wrist well bent, and the elbow close to the side.

459. When the right hand is on the reins or using the whip, it should be kept close to the left, the forearm being nearly horizontal. It can then rest on the thigh and yet be ready for any emergency.

460. The wheelers should be hit in front of the saddles, to avoid making them kick. It is no use hitting the wheelers if the leaders' reins are too long. In this case you must first shorten up the wheelers' reins, and then use the whip on the leaders; otherwise, as soon as the wheelers have jumped into their collars, the leaders will again press forward and allow the wheelers to hang back as before.

461. The proper hitting of the leaders with the whip can only be acquired by constant practice when off the wagon. A good whip can hit his leaders wherever he desires and without the dangerous, flail-like swipes that some teamsters appear to consider necessary.

To Start.

462. Feel all the animals' mouths, and, if necessary, give them the word to go, dropping the hand to them at once until the vehicle is fairly off. The wheelers ought to start the wagon, and this can be effected by touching them with the whip, if they require a hint. It is never safe to start without having the whip in the right hand, ready for immediate use. The whip is to the driver what the leg is to the rider, that is, it keeps the team up to their bits. As soon as the team is going straight, take the right hand off the reins, at the same time keeping it close by, ready for any emergency.

Pulling up.

463. When you want to pull up, shorten all the four reins by passing the left hand up to the right, or else by pulling all the four reins through from behind, as before explained; then, having the right forefinger on the near lead rein, the middle finger on the near wheel, and the lower fingers of the right hand on the off reins, pull both hands back toward the body, and if necessary lean back a little.

Should the team be getting the better of you, and you find that you can not stop it, it will be found a great assistance to place the right leg over all the four reins, as you may be able to stop them by the extra power and leverage by the position of the leg. Of course it is understood the brake has been applied.

A Few Hints.

464. Always keep a steady pressure on the reins.

Never remove left hand from reins, even though the right may be holding them in front, as it is very difficult to get the left hand back into its place again with the reins in the right places.

Lead reins should seldom be removed from left hand.

Grip the reins tightly with third and little fingers to prevent their slipping.

Alter position of bits if the team pulls hard.

See to it that your wagon is always well greased.

Always take a pull at the team to steady it just before you arrive at the crest of a hill, and begin to descend slowly, holding the leaders steady, and with just enough traction to keep their singletrees from hitting them.

In crossing ruts and in turning corners be careful that the leaders are out of draft; otherwise the pole may be snapped off or the wheelers pulled down.

If, while going down a hill, and especially when near the bottom, you find a wheeler slipping on his hocks, do not try to pull him up, but drop the hand and allow the team to go a trifle faster.

Rules of the Road.

465. Always keep to the right when meeting vehicles.

On a narrow road a loaded team has the right of way, and it should be given ungrudgingly.

On overtaking a vehicle, pull out to the left and pass it at a steady pace and without cracking your whip or coming in too close.

When followed closely by another vehicle and both are at a good pace, signal with your whip if you are about to slacken your gait or change your direction.

When approaching a railroad crossing, bring your team to a walk; halt if necessary, but always look and listen.

Be courteous in observing the simple rules of the road; give plenty of room to others, and do not forget that a smile or a pleasant laugh will do more for you than a growl or a surly remark. Horsemen, as a rule, possess good dispositions; meet them, at least half way.

CHAPTER IV.—CARE OF SADDLE ANIMALS.

466. Animals for riding purposes should be selected with a view to the adaptability of their backs to the saddle.

467. The back of a saddle animal should be fairly short. A short back sustains weight better than a long one. The withers should not be high enough to be rubbed by the pommel arch when the horse's condition is low. A broad, low withers is objectionable for the reason that it is liable to be pinched by the saddle bars. It also allows the saddle to drift to the front, and, as a matter of course, the cincha will come in contact with the elbow and lower breast muscles, where it is liable to produce galls.

A short back with medium withers is rarely concave (sway back) to any great extent. Such backs generally have well-developed, well-rounded, deep chests, and properly proportioned abdomens.

468. A thin, tucked-up belly is undesirable in a saddle animal, the reason being that the saddle has a tendency to drift to the rear, no matter how tightly it may be cinched; then, too, animals with tucked-up bellies are "poor keepers," and go to pieces quickly in the field. On the other hand, "pot-bellied" animals, as a rule, are narrow and flat in the chest ("slab-sided"), usually poor stayers, and are generally of a sluggish disposition.

469. The problem in the field is to keep the back in good condition. A sore back means a led horse, and for riding purposes a useless one.

It is believed that with fair care in saddling, riding, and unsaddling an animal of decent saddle conformation, a continuous march of 2,000 miles and more, at the usual rate, with the pack up, can be made without a gall. This supposes, of course, that there is a sufficiency of forage to keep the animal in fair condition of flesh.

Blanket.

470. The blanket should, if possible, be kept dry and free from sand, caked dandruff, and hairs. It should be frequently shaken out and well switched, if necessary, to retore its pliability and remove dust and hair. In warm weather, when the animal sweats freely, a fresh, clean bearing surface on the blanket should be placed next to the back.

It is not a good plan to dry the sweat-soaked surface of a folded blanket in the sun and put this dried surface next the back the following morning. Such drying hardens the dandruff mixed with sweat and dust that is always present, and makes this part of the blanket rough and hard. It is preferable to double the sweat-soaked folded blanket on itself, so it will remain moist and soft.

To keep the back and saddle blanket clean and the latter free from sweat, a piece of smooth canvas, slightly smaller than the folded blanket, and placed next to the skin, will be found to give satisfactory results. This piece of canvas should never be washed, but should be allowed to become smooth and slick.

Before placing the blanket on the back, be sure that both are free from sand and dust, and that the mane lies properly. Place the blanket in position in such a manner that it will not disturb the mane or ruffle the hair of saddle bed, and be sure there are no wrinkles in any of its folds.

Saddle.

471. It is of importance that the saddle fit the rider as well as the horse.

A saddle too large for the rider may not be objectionable, if stirrups are of the proper length, but a saddle with too small a seat causes the rider to place undue weight over the cantle arch. This uneven distribution of weight causes the rear of the bars to bore into the muscles of the posterior portion of saddle bed and to induce "cantle sores," or so-called "kidney sores."

A saddle too large for the animal may press on the thinly covered ribs when he becomes low in flesh. Doubling the blanket will not save him from the inevitable gall. As such a saddle sits lower on the back as the animal's condition becomes low, the pommel arch will, if withers are high, cause contusion there, and may produce a fistula.

In selecting a saddle, secure one that will not be too large for the animal when he becomes thin, and that will not be too small in the seat to properly accommodate the rider.

Saddling.

472. There is no hard and fast rule for placing a saddle in position on the back. The saddle place is determined by the animal's conformation, and will sooner or later, during the morning, take that place irrespective of tight cinching. On backs of good saddle conformation, however, the saddle if too tightly cinched may interfere with the free play of the shoulder blades, when placed too far forward in the first instance, and may remain for a sufficient length of time in this objectionable position to cause lameness by the irritation of the muscles that run from the upper part of shoulder to the bones of the arms.

The saddle should not be placed too far to the rear, for two reasons: First, on most backs it causes it to tilt forward and bore into the muscles back of the withers; second, this position brings the cincha back on the "floating" ribs, where it will compress them, thus interfering with the proper expansion of the lungs.

The saddle being placed in the proper position, determined by the conformation, and on the blanket, which should be without the suspicion of a wrinkle, the rider should see to it that all straps, buckles, and lashings are free of the bars, that the bars rest only on the blanket, and that the pack on pommel and cantle does not rest on the withers nor the back.

It should now be seen to that the quarter straps are evenly adjusted, and that there are no wrinkles or rough places on the ring safes.

Cinching.

473. The cincha should not be unduly tightened. Tight cinching causes young animals to rear and even throw themselves. It induces local swellings and galls, by interfering with the circulation, and it teaches all saddle animals to inflate the lungs ("swell themselves") the moment they feel the touch of the cincha. On cold mornings tight cinching causes even old saddlers to buck.

Take up the cincha gently and draw it snugly, then secure it temporarily. Adjust your stirrups and see that they are of equal length. This can be judged by standing in front of the animal and comparing one with the other. It will be found that from the often repeated mounting and dismounting on the near side the stirrup leather of that side will usually be found longer than the other. Having adjusted things generally, return to the cincha and take up the slack that will now be found, draw it snugly but not tightly, and secure it, being careful that there are no wrinkles in the strap and that the cincha itself does not encroach on the quarter strap ring shield. If it does, either the cincha strap is too long on the off side or the cincha is too long. In either event, make the necessary correction at once, if possible. If this correction is not made soon, a gall may be expected.

Unsaddling.

474. On arriving in camp and having dismounted, ease off the cincha about 3 inches and change the bearing of the saddle by moving it to rear or front at least an inch. Allow the saddle to remain on the back for ten or twelve minutes, to enable the almost bloodless skin beneath (caused by weight of yourself and pack) and the tired saddle bed muscles to regain to some extent their lost tone, while you busy yourself about the bridle and halter, and the religious duty of closely examining the feet for loose shoes, rocks, nails, bruises, thrush, and interfering sores. Now remove the saddle, turn over the blanket, and let that remain in place until the back has dried.

475. If any dry spots are noticed on the sweaty skin while the blanket is being turned over, remember they are inflammations of the skin, produced by unequal distribution of weight, and are liable to puff up later if not attended to. Mark their location well, for you are close to the walking stage if you neglect them. When the back is dry, remove the blanket and take care of it. Massage well from front to rear the spots referred to, bathe the saddle bed with clean water, dry it, and let the animal roll if he will. Should small swellings appear, however, keep the blanket in place until a soaking wet gunny sack is procured. Now remove the blanket, massage the swelling vigorously, and put the wet folded gunny-sack pack over the back and secure it there. Do not allow the animal to roll if it can be avoided, and keep the pack wet during the night. In the majority of cases the animal will be ready for careful saddling in the morning.

476. should you have produced a gall, the place should be bathed and disinfected with a creolin or carbolic-acid solution (1 ounce to the quart of water), the spot protected from the flies, cold-packed if necessary, and the animal led until nature effects a cure. Close attention to cleanliness, disinfection, and stimulation of the wound will hasten the process. Use a solution of aloes or alum in water (one-half ounce of either to a pint of water) as a stimulant.

477. Even with very close attention to saddling, galls may be produced if the rider is not a careful one.

Irrespective of the fit of the saddle and condition of blanket, the things that cause galls and "bunches" most frequently are carelessness in balancing and securing the pack, a lounging, shifting seat, and a sloppy method of handling the reins, inattention to proper cinching, unequal length of stirrups, neglect of adjustment at the halts, the riding of a lame animal, and the galloping of a leg-weary one.

Bitting.

478. Use a snaffle in preference to a curb, and adjust it so that it will not elevate the corners of the lips. When a bit and bridoon are used, let the bit hang somewhat lower than the bridoon. Adjust the curb strap or chain properly, and be sure that the animal is comfortably fitted.

The inside of the lower jaw is often injured by ignorant handling of the curb rein. These injuries appear above the bridle teeth or "tusks" and present inflamed places that sometimes exhibit ulcers. Quite often the bone is splintered. Less frequently the under part of the jaw, in the vicinity of the curb groove, is bruised and perhaps fractured more or less completely.

Any of these conditions may be made manifest by the animal "fighting the bit," "throwing the head," or rearing.

479. These injuries should be treated by putting the animal on a snaffle at once and placing it high enough in the mouth to avoid any pressure on the injured parts. If ulcers appear, wash them out frequently with a saturated solution of boracic acid. When the bone is splintered it is usually a serious matter, and the parts should not be interfered with by the inexperienced.

CHAPTER V.—CARE OF PACK ANIMALS.

480. The selection of a properly shaped pack animal for use under the aparejo is a difficult one to the novice, but it can be made with ease by one who has an intimate knowledge of the conditions under which such an animal must serve.

481. The pack animal should be between 14 hands and 1 inch and 15 hands in height. He should be of a chunky build, possessing a strong, fairly straight, well-shaped back. His withers should not be high, nor sharp; neither should they be low enough to slope the back to the front, and his weight should be in the neighborhood of 975 pounds.

Too small an animal will not "stand up" under the usual pack load of 250 pounds.

Too tall an animal will be inconvenient to pack, as the cargo must of necessity be elevated by one man on each side of him.

482. Having a pack animal of good conformation to begin with, understanding the construction of the aparejo and being familiar with the method of "setting up," "ribbing," and stuffing it, and of breaking it in to a particular animal, it is believed that the withers, sides, belly, elbows, loins, and dock of the animal to which a well-fitting aparejo pertains may be kept free of "bunches" and galls under ordinary service conditions in the field.

483. In an organization where the art of properly "ribbing," stuffing, and fitting an aparejo is more or less of a mystery, it is only a question of a few days on the march, even with light cargoes, until many of the pack animals will be unable to transport a burden, on account of the quickly appearing galls, sores, and "bunches" produced by faulty distribution of the sticks, which may be either too large or too small. The wrong kind of hay, or too much or too little of it may be used in the stuffing. The aparejo itself may be too deep, too shallow, or too narrow.

484. Should the wrong kind of hay be used for stuffing purposes it is apt to cake or wad in a day or two. Should too much hay, even of the soft, crisp variety, be used, it will cause the aparejo to flare or stand out and lose its grip on the body of the animal. Should too little of the hay be introduced it will not provide sufficient protection for the animal's ribs.

485. If the aparejo should be too deep, it will have a tendency to wrap itself around the belly and cause belly sores. Should it be too shallow it will ride too high, be defective in grip and drift to the front or rear, depending on the kind of trail traveled. Should the "ribbing" sticks be too stiff, or taper in the wrong direction, they will not adapt themselves to the shape of the animal's frame, and if too slender they will lack spring enough to keep the weight off the ribs.

486. When the corona is neglected, or improperly scraped and cleaned, it may cause irritation of the skin. The same is true of the crupper.

487. The proper "ribbing," stuffing, and packing of the aparejo is an art that can only be acquired during a long apprenticeship. Throwing the "diamond" hitch, the sole stock in trade of some men, is but a small part of the packer's art, and may be learned in two lessons by even a dull intellect.

Keeping the animals on the trail day after day, each one carrying his load, in good health and sound body, is a problem for an expert packer.

488. In a supply pack train on the march the cargoes, as a rule, decrease in weight from day to day as rations, ammunition, and forage are expended, and this is taken advantage of to favor weak or galled animals. In organizations where the cargo is fixed by regulations, the weight is usually 235 pounds, and is seldom reduced. It follows, as a matter of course, that the latter pack outfit, even though it may be small in numbers, demands closer attention to the warding off of galls than the former.

489. When an aparejo of the size suitable to the animal is properly fitted to a particular animal, and by fitting is meant its close adjustment to the animal's frame in the same manner as a shoe of the proper size conforms to the inequalities of the human foot when well broken in, never change it to another with a view to packing unless absolutely necessary, and not even then until it has been restuffed, perhaps reribbed, and thoroughly broken in to the new conformation. Neglect of these precautions will be productive of serious mischief.

490. The disabling conditions, caused by the aparejo, to be guarded against are bruised withers, galled elbows, belly sores, crupper galls, and loin and back sores.

491. Contusion of withers is the result of undue height of same, too narrow or too wide a collar arch, lack of sufficient stuffing in front under arch, improperly balanced top load, defective conformation of animal, and drifting of aparejo. Contusion of withers is a serious matter. The pressure should be removed at once, and the entire withers covered with a cold-water pack. A folded gunny sack, kept well saturated with water and secured in place, will produce good results in allaying inflammation. If a fistula should form, usually indicated by a running sore, the animal, as a rule, becomes unfit for pack purposes thereafter.

492. Galled elbows are due to contact with the cincha. When a properly adjusted cincha infringes on the elbow and produces galls, it shows that the aparejo has been placed too far forward, or that the animal's conformation is defective ("soldier toed"). Packers generally adjust the aparejo so that the cincha passes about 1½ inches behind points of elbow.

Treatment of elbow galls consists in freeing them of the irritating cause and keeping them clean. They heal rapidly.

493. Crupper galls, in open country, indicate that the aparejo is either too long or too short. If too long it will wrap around the chest to some extent and develop a tendency to drift forward, thus putting undue strain on the crupper. Should the aparejo be too short it will be defective in body grip, and will shift from side to side, especially with a top load. This swaying will cause the crupper to act as a saw. Should a properly fitting aparejo cause crupper galls, they may be traced to too tight lacing of the latter, or by too much stuffing of the aparejo in the boots. The overstuffing near the boots weakens the grip on the body.

Treat crupper galls by proper adjustment of aparejo, thorough cleaning of wounds, and the application of a solution of aloes in water (one-half ounce to the pint). If these galls are severe, wash, after cleaning and before applying the aloes, with a creolin solution of 1 ounce to the quart of water.

494. Loin or kidney sores are due to the aparejo drifting to the rear, an unusual condition except in hilly country; or to placing it improperly on the back and holding it there by means of the crupper, or by the unequal distribution of the cargo.

These kidney sores readily respond to treatment when the cause is removed. A cold water pack (wet gunny sack) soon relieves the inflammation.

495. Belly sores are the result of too tight cinching. The fit of the aparejo has considerable influence on the cinching, for should the aparejo flare at the boots from overstuffing, it will not conform to the shape of the animal, and undue cinching will have to be resorted to to hold it in place. With very tight cinching a patch of skin on the under part of the chest may have its circulation entirely stopped; in such an event a piece of dead skin may come away when the cinch is taken off and leave a nasty wound. Proper size of aparejo and proper "ribbing" and stuffing should be the preventive. Cleanliness, disinfection, protection from dust and flies, and the application of a weak solution of aloes or alum in water (one-half ounce of either to the pint) will give good results in the line of treatment.

496. Body sores, galls, and swellings, the most disabling of all aparejo troubles, are caused by the following: Bad conformation, unequal pressure, wrong "ribbing," careless stuffing, imperfectly broken-in aparejo, aparejo too short, aparejo too narrow, careless packing, overloading, and unwieldly top load.

497. Swellings are due to interference with the circulation of the skin at the particular spot, for at that spot the extreme pressure lowers the tone of the small blood vessels, which, when pressure is suddenly released, become engorged with the constituents of the blood, and remain so engorged until the tone is regained. If the tone should not be regained the swelling will persist, the skin there will mummify and a sitfast or callous will form. Should the circulation be entirely stopped and the small blood vessels become paralyzed, a patch of skin will slough off (mortify) and leave an angry-looking wound more or less deep.

Simple galls are due to rubbing or chafing of the part.

498. When putting on the aparejo, see to it that the corona is right side front, clean and smooth, and that the aparejo itself belongs to the animal on which it is put. A general rule can not be laid down for packing and cinching, and experience must be the teacher.

499. On reaching camp, remove the cargo in a leisurely manner, relax the cincha, and allow the cinched aparejo to remain in place for 15 minutes or so, until the circulation of the skin of the back is restored to the normal and the parts under the aparejo become gradually cool. When the aparejo is at length removed, examine the back for swellings, and massage them from front to rear, to cause them to disappear. Apply a cold water pack, if necessary, and keep it wet and securely in place.

500. Very often fairly large swellings may be reduced by simply putting a dry blanket over the back and immediately replacing the aparejo and cinching it snugly.

501. When a swelling persists, or when it is evident that there is undue pressure on a particular spot, the aparejo should be chambered on the bearing surface over that spot. Chambering consists in taking out the stuffing at the spot indicated, so as to relieve the pressure. This chambering is done by inserting the hand in the handhole and carefully withdrawing the stuffing at the place selected. To accurately locate the place where the chambering is needed, apply a little wet clay over the swelling and then put on the bare aparejo and fit it into its proper place and roll it slightly from near to off side. The wet clay over the swelling will adhere to the leather and mark the exact spot sought for.

502. It is the custom in some pack trains to "pack out" the "bunches" by means of light loads. This treatment is effective only when the small blood vessels have not entirely lost their tone. Where a sitfast or callous forms, or where a slough takes place, there is no simple remedy to take the place of the operation and energetic treatment indicated.

503. The pressure of the unpacked aparejo, massage, and cold water packing are to be relied on when body "bunches" appear.

In all cases, where practicable, relieve the suffering animal from weight of cargo. A rest of 24 hours may restore him to work.

Wounds of the back should be kept clean and protected from dust and flies.

504. When it is not intended to carry loads, mules should not be tightly cinched. A pack mule is best kept moving. At halts of sufficient duration the loads should be removed. At longer halts the cincha should be loosened, but only at sustained halts should the mules be unharnessed.

CHAPTER VI.—STABLE MANAGEMENT.

505. Foul air and dampness cause many of the diseases of the horse, hence the importance and economy of spacious, clean, dry, and well-ventilated stables. Ceilings should be 12 to 15 feet high, with large ventilators through the roof, and a window or a side aperture in each stall, which should be placed well above the horse's eyes. If possible, the building should have no upper story or loft.

Double stalls should be not less than 9 feet wide by 10 feet 6 inches long, measured from the wall, and not less than 1,200 cubic feet of air space should be allowed to each horse in the stable.

In stables with a loft, ventilation from the top is always insufficient, and there must be side openings well above the horses, so that the draft will pass over their heads.

These openings should not be closed, except on the windward side, to keep out the rain or snow.

If the stable is partitioned off into single stalls, each stall should be at least 5 feet in width, to permit the horse to lie down without difficulty.

A picket line is established in the immediate vicinity of each stable, the horses being tied to a manila or wire rope or chain passed through the picket posts. There should be shallow trenches behind the horses to carry off the rain, the ground on which they stand having just enough slope to let water run into the trenches, or there may be a single drain in the center along the line of the posts. Constant attention must be given to keeping the ground about the picket line in good order.

General Rules for Stable Management.

506. The following general rules are recommended:

The stable sergeant has immediate charge of the police and sanitary condition of the stable, picket line, etc., and is the custodian of the forage and stable property generally.

The stable is to be kept thoroughly policed, free from smells, and, except portions of the stalls that horses can reach, should be lime-washed. There must be no accumulation of manure or foul litter inside, nor near the doors or windows without. The feed boxes are washed from time to time and kept clean. The ground about the picket line is swept daily, and all dung, etc., carried to the manure heap.

Except at night, when the horses are bedded down, no manure or urine is to remain in the stalls; the stable police remove it as it accumulates.

If practicable, all woodwork within the reach of the horses and not protected with sheet iron or other metal, should be painted with thin coal tar to prevent it being gnawed. The same precaution may be followed with regard to troughs, picket posts, and picket line. It should be thoroughly dried before putting horses near it.

Smoking in stables, or in their immediate vicinity, is prohibited.

One or more lamps will be hung in each stable to burn during the night.

The horses are stalled according to their sections; their places at the picket line will be in accordance with the same rule.

Over each horse's stall is placed the name of the horse under the name of the man to whom assigned.

Clay is the best for earthen floors. Gravel or sandy earth is not suitable.

The sloping of the floor of stalls from the manger to the heel-post is injurious and uncomfortable for the animal, making him stand in an unnatural position, with the forelegs higher than the hind ones. When the earthen floors are level, the horse will paw a hollow for his forefeet unless he can elevate his hindquarters by backing out of the stall.

Whenever horses go out of the stable, the windows of their stalls are to be kept open, unless necessary to exclude rain or snow, or when cold drafts affect the animals in contiguous or opposite stalls.

Stable doors are never closed in daytime, except to keep out wet or to exclude cold winds that blow on the horses. If the doors be in a single piece, bars are put across the doorway; if divided into upper and lower halves, it will usually be sufficient to open the upper part. At night the entrance to the stables should be secured in such manner as will prevent the escape of animals.

When circumstances permit, horses should be turned loose in the corral during the daytime or herded under the charge of a guard. When neither is practicable, they should, except in very cold, windy weather, or in very hot weather where there is no shade, stand most of the day at the picket line, as they have better air and are less confined, while the stables become drier and more healthful.

In ordinary climates, cavalry stables must be kept as cool as possible. If the horses do not stand directly in the draft, the colder the stable the less will they suffer if called suddenly to take the field. For the same reason, horses should never be blanketed in the stable, except during very cold weather.

507. Horses require gentle treatment. Docile but bold horses are apt to retaliate upon those who abuse them, while persistent kindness often reclaims vicious animals.

A horse must never be kicked, or struck about the head.

At least two hours' exercise daily is necessary to the health and good condition of horses. They should be marched a few miles when cold weather, muddy ground, etc., prevent drill.

Horses' legs will be often hand-rubbed, particularly after severe exercise, as this removes enlargement and relieves or prevents stiffness.

The sheath will be washed out when necessary with warm water and castile soap, and then dried with a cloth.

Sick Horses.

508. The horses on sick report are in charge of the stable sergeant, who reports daily to the captain for instructions as to their treatment.

The sick horses are inspected daily. The names of the horses on sick report, and the treatment they receive, are recorded daily in the sick book.

In treating sick horses, it is to be observed that very little medicine is ordinarily required, and that unnecessary doses do a great deal of harm.

If a horse sustains an injury, neglects his feed, refuses to drink, or gives any evidence of sickness, it will be at once reported.

No horse on sick report will be taken from the stable or picket line for exercise or work without permission from proper authority.

509. If there be at any time a suspicious discharge from one or both nostrils of an animal, it must be immediately reported.

To prevent contagion to man or beast, an animal that shows any decided symptom of glanders is to be isolated at once, and confined or tied up in some locality where no other animal can approach him.

510. A glandered horse should be killed as soon as possible. The stall in which he stood is torn down and all the woodwork burned and the ironwork disinfected, or otherwise it is closed, and must remain empty until the rack, manger, and every part of the iron and wood work, as also the vessels used in watering and feeding, and his saddle and bit have been three or four times thoroughly washed with a 5 per cent solution of carbolic acid or a 1 to 1,000 solution of corrosive sublimate; all parts to which the latter has been applied should be thoroughly scrubbed with hot water to remove all traces of the poisonous salt. The application of a lime wash to all the stalls, after complete disinfection, will be desirable. Small articles, such as bits, etc., can be disinfected by keeping them immersed for a half hour in boiling water. All articles of little value that have been used with a glandered horse, such as halters, bridles, horse cloths, saddlecloths, blankets, nosebags, currycombs, brushes, etc., should be destroyed.

Stables occupied by infected or suspected horses should be disinfected daily by washing exposed surfaces with a 5 per cent solution of carbolic acid, and nosebags, halters, buckets used for drinking water, etc., should be carefully washed with the same solution or with boiling water.

511. Drugs and dressings sufficient, under ordinary conditions of field service, for 100 animals for one month:

Boracic acid: 4 ounces, saturated solution, for disinfection of wounds of eye and vicinity.
Carbolic acid: 16 ounces. A solution of 1 ounce to 1 quart of water to disinfect wounds of body.
Alcohol: 1 quart; 2 ounces in pint of water as a quick stimulant.
Aloes: 20 ounces; 1 ounce as a cathartic; ½ ounce to pint of water stimulates wounds.
Alum: 4 ounces; ½ ounce to pint of water acts as a nice stimulant to wounds.
Ammonia, aromatic spirits of: 16 ounces; 2 ounces in pint of water a quick stimulant.
Ammonia, solution of: 8 ounces; used to make liniments.
Cannabis Indica: 16 ounces; ½ ounce to the dose in cases of colic to relieve pain.
Charcoal: 8 ounces; used to dust on exposed wounds.
Cosmoline: 2 pounds; used to make ointments.
Creolin: 1 pound; 1 ounce to quart of water as a disinfectant for wounds.
Ether, nitrous: 16 ounces; 2 ounces in pint of water as a stimulant.
Iodine crystals: 2 ounces, with which to make a saturated solution or tincture for application to sprains.
Copper sulphate: 1 ounce, to cut down granulations (proud flesh).
Mercury, bichloride tablets: 1 ounce; 1 tablet in pint of water as a disinfectant for wounds.
Olive oil: 1 pint, with which to make liniments.
Turpentine: 1 pint, to make liniments.
Tar, oil of: 4 ounces, with which to make ointments.

DRESSINGS.

Absorbent cotton: ½ pound, for eye pads.
Antiseptic gauze: 1 package, for dressing of wounds.

Oakum: 3 pounds, to be used in dressing wounds.
Red flannel bandages: 1 dozen.
White cotton bandages: 2 dozen.
Silk thread: ¼ ounce.
Soap, castile: 1 pound.
Sponges: 4, small.
Adhesive plaster: 1 roll.

INSTRUMENTS, ETC.

1 farrier's case.
1 thermometer.
1 twitch.
1 drenching bottle.
4 small bottles and corks.
1 tin basin.
2 quart bottles and corks.
30 sheets tissue paper.

A liniment: Olive oil, 3 ounces; turpentine, 2 ounces; ammonia (solution of), 2 ounces. Mix well. Apply with slight friction.

A stimulant: Aromatic spirits ammonia, 2 ounces; alcohol, 1 ounce; water, 16 ounces. Mix. Give as a draught.

A good dusting powder for wounds: Air-slaked lime, 16 ounces; powdered charcoal, 2 ounces. Mix. Dust on open wounds.

An ointment: Oil of tar, 1 ounce; creolin, ½ ounce; cosmoline, 6 ounces. Mix.

512. The captain is responsible for the proper performance of stable duty in his company.

A noncommissioned officer, designated as ***stable sergeant,*** or ***corporal,*** is detailed in each company to take immediate general charge of the forage and stables. He is held responsible for the proper policing and sanitary condition of the stable, picket line, and ground pertaining to them. Two or more men, called ***stable police,*** are detailed for the purpose of policing, removing manure, feeding, etc., under the direction of the stable sergeant.

Usually horses are groomed twice daily, at morning and at evening stables, under the supervision of the first sergeant and a commissioned officer. Under special circumstances, it may be advisable to groom only once a day.

The stable police, after grooming their own horses at morning stables, clean out the stalls and police the stable, under the direction of the stable sergeant. The bedding is taken up, that which is much soiled being separated from the manure heap, and the remainder put on the litter racks or spread upon the ground to dry.

At or before evening stables the stable is policed, the bedding is laid down and fresh straw spread on top of it; the bed must be soft and even, with the thickest part toward the manger; where horses eat their bedding, the old litter should be placed on top of the new straw.

Grooming.

513. The grooming is always done at the picket line, except in stormy weather. Stable call is the first call or warning call for stables, and precedes assembly by such interval as may be prescribed. The roll having been called, the company is marched to the horses or stable, and upon arrival there the first sergeant commands, ***Commence grooming, by sections; fall out.*** The horses are then tied on the picket line, if not already there, and are groomed under the direction of the chiefs of sections. Each man habitually grooms his own horse, except that the horses of the first sergeant and master signal electricians may, at the discretion of the company commander, be groomed by the men of the section to which these horses are attached. Drivers and wagoners groom the animals assigned to them.

For the purpose of proper supervision in grooming, feeding, etc., the horses of the men not assigned to sections and other supernumerary horses, will be attached to sections.

At stables each man examines his horse's feet. Horses requiring shoeing are reported to the noncommissioned officer in charge of the section, who notifies the stable sergeant.

Each horse should be groomed not less than 20 minutes, and as much longer as may be necessary. When the horses of any section are sufficiently groomed, the chief of section reports that fact to the first sergeant. The section, at the discretion of the company commander, may then lead in, and the horses will be led to their stalls and properly secured under the supervision of the chief of section. Should the officer wish to inspect the horses of any section or of the whole company before they are led in, he will notify the chief of section or the first sergeant, who will then command: ***Cease grooming; stand to heel.*** When all the horses have been groomed and led in, and the grooming kits put away, the first sergeant will form the company, march it to the company parade, and dismiss it.

If, when the horses are inspected, the officer finds any of them not properly groomed, he will direct that these horses be left at the picket line and groomed under the supervision of a noncommissioned officer detailed for that purpose.

To Groom.

514. The horse's feet are first thoroughly cleaned with the hoof pick. Then take the currycomb in the right hand, fingers over back of comb; begin at the near side at the upper part of the neck, thence proceed to the chest, arms, shoulders, back, belly, flank, loins, and croup in the order named. Then go to the off side, taking the comb in the left hand, and proceed as before.

The currycomb is applied gently and is used only to loosen the scurf and matted hair; it is not used on the legs from the knees or hocks downward, except to carefully loosen dried mud.

Next, take the brush in the left hand and change the currycomb to the right; begin at the head and then the neck on the near side, and proceed in the same order as in currying, brushing also the parts not touched by the comb; on the off side take the brush in the right hand, the currycomb in the left. The principal working of the brush should follow the direction of the hair, but in places difficult to clean it may be necessary to brush against it, finishing by leaving the hair smooth. After every few strokes clean the brush of dust with the currycomb.

Having finished with the brush, rub or dust off the horse with the grooming cloth, wipe out the eyes, ears, and nostrils, and clean the dock. The skin under the flank and between the hind quarters must be soft, clean, and free from dust.

Currycombs, cards, or common combs must never be applied to the mane or tail; the brush, fingers, and cloth are freely used on both. Straw is used when the horse comes in wet from exercise, rubbing against the hair until dry, from his hind quarters up to his head. If very wet, very hot, or very cold, blanket the horse, groom and hand-rub the legs; then remove the blanket and groom the body.

Feeding.

515. In garrison it is recommended that grain be fed by the stable sergeant, assisted by one or two members of the stable guard or police at first call for *reveille*. The grain, in a box on wheels, is rolled opposite the stalls, whence it is transferred to the feeding boxes by allowance measures. Grain is fed again at evening stables as in the morning, but not until the hay has been distributed and the stable swept out and the dust thoroughly settled.

In camp or on the march grain is fed morning and evening. The men are marched to the forage wagons or other grain depository, where the noncommissioned officer in charge, with an allowance measure, issues to each in turn.

The chiefs of sections then march their sections back to the horses and command: ***Feed***. Ordinarily one man of each section will remain near the horses until they have done eating, to adjust nose bags. Each man may be required to feed and groom as soon as he has received his grain.

In garrison hay is usually fed in the evening, but when the horses are kept in the stables during the entire day a portion is fed in the morning. The dust must be well shaken out of the hay before it is put in the mangers.

In camp hay is fed at the picket line morning, noon, and evening; on the march, when the horses are grazed during the day, in the evening only.

The use of bran once or twice a week is important for stable horses. In spring or early summer they should be grazed.

Two and a half ounces of salt should be given each week, preferably lumps of rock salt, secured in or near the manger.

When forage can not be obtained, grazing should be allowed at every spare moment, both in camp and at halts on the march.

The daily allowance of oats, barley, or corn is 12 pounds to each horse and 9 pounds to each mule; that of hay, 14 pounds to each animal; the allowance of straw for bedding is 100 pounds a month to each animal.

516. Good oats weigh about 40 pounds to the bushel; barley, about 48 pounds; corn, about 56 pounds. Pressed hay weighs about 11 pounds to the cubic foot.

The standard bushel in the United States contains 2,150.4 cubic inches. A cubic yard contains 21.69 bushels. A box 16 by 16.8 by 8 inches holds 1 bushel; a box 8 by 8.4 by 8 inches holds 1 peck; a box 8 by 8 by 4.2 inches holds one-half peck, or 4 quarts.

Watering.

517. Horses must be watered quietly and without confusion; the manner in which this duty is performed is often a good test of the discipline of a mounted command.

Horses are to be led to and from water at a walk. At the drinking place no horse should be hurried or have his head jerked up from the water.

In the field or on the march the watering is from the most convenient running water; in garrison it is usually from troughs, which should be cleaned each day. In warm weather water drawn from a cold well or spring should stand long enough for the chill to pass off.

The horses are watered under the immediate direction of the chiefs of sections, but if they are liable to meet those of other commands at the watering place a commissioned officer should supervise this duty.

Horses should be watered before feeding or not until two hours after feeding. Ordinarily they should be watered twice a day; in hot weather three times a day. In very cold weather once a day, about noon, is sufficient. A horse will rarely drink freely very early in the morning.

If a mounted command have to march a long distance without water, so that it will be necessary to encamp en route, the animals are fed, and denied water until just before starting, when they are permitted to drink freely. The command marches in the afternoon and does not encamp until it has accomplished at least half of the distance, and moves early next morning to reach water.

Watering the horses on the march depends in a great measure upon the facilities to be had. If nothing is known as to the country over which the day's march is to be made, water call should be sounded shortly before leaving the camp and every horse given an opportunity to drink. As many animals, however, will not drink at an early hour, or until after exercising, the horses should be watered at the first opportunity. On severe marches frequent watering is of great benefit.

The daily allowance of water for a horse at rest is about 6 gallons; when at work, from 8 to 12 gallons; for a man, 1 gallon for all purposes. One gallon of fresh water weighs 8⅓ pounds, approximately 1 pint to 1 pound.

PART V.

TRANSMISSION OF INFORMATION.

CHAPTER I.—GENERAL PRINCIPLES.

518. The primary function of the Signal Corps is the transmission of information and orders affecting tactical and strategical situations. This will be constantly kept in view in all drill-ground and school training.

When by reason of the exposed nature of the duty assigned to any signal detachment an escort becomes necessary, an application therefor will be made to the proper authority.

519. A signal officer should seek to maintain the most intimate official relations with his commanding officer and the latter's staff, and to be completely in his confidence, in order to obtain the earliest possible information of all intended movements and the probable course of events as far as can be foreseen. The prompt establishment of lines of information will be greatly influenced by this cooperation.

520. In order that the condition of the equipment may be such as to insure the efficient operation of all lines of information at all times, the equipment will be frequently inspected, under direction of the company commander.

521. Officers only will use the telephone on field lines, and then only in such cases where the same ends could not be attained by written messages. Operators are not permitted to receive verbal messages for transmission. Operators when directed otherwise by officers will, before obeying, respectfully invite the officer's attention to this rule, and report the circumstance and the name of the officer to the signal officer in charge of the line. Written messages may in case of necessity be transmitted by telephone, and in all such cases the entire message will be repeated back.

522. The company commander should secure such distribution of his company, whether in camp, on the march, or in combat, as will meet every probable contingency that may arise. Orders to his subordinates should contain all the information relative to the commanders and organizations between which lines of information are to be established, the terrain over which they are ordered to operate, the number and location of stations, and the equipment to be carried by them as may be necessary to insure a thorough understanding of their mission. The general principles and rules governing the composition and forms of field orders as laid down in the Field Service Regulations should be followed.

Field Lines.

523. The lines of information established and maintained by field companies and battalions are *tactical lines,* and are generally designated field lines. They are intended to furnish a quick, safe, and reliable means of transmitting information and orders between the headquarters of the field army and the divisions and auxiliary troops of which it is composed, and within the divisions.

524. The means of transmission over such lines of information may be electrical, as by wireless telegraph, buzzer, and telephone, or visual, as with the heliograph, lantern, rockets, etc., or by messenger.

Visual signaling will be used only when the nature of the terrain or atmospheric conditions or lack of equipment preclude the possibility of electrical signaling. The flag and heliograph are used for signaling during the day. At night the acetylene lamp, rockets, and the Very pistol may be used, but they will not be resorted to except upon the failure of electrical signaling. The possibility of interception by the enemy and the likelihood of disclosing our own position will cause this class of signaling to be used with caution.

Messengers will be used when other methods have been found impracticable or have suddenly failed.

525. Signal officers should be skilled in the use of the cipher, so that they may assist officers in enciphering and deciphering messages.

The advantages of sending messages in cipher, when there is danger of their falling into the hands of the enemy, or when it is desired to maintain secrecy in our own forces, should be pointed out to all officers.

526. The commanding officer must be kept in communication with such parts of his command as he considers necessary, at all hazards.

LIBRARY
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527. Field lines between the headquarters of the field army and the divisions should start from the headquarters of the field army and move forward with the current. Similarly, lines to be established within the division should start from division headquarters, although exceptional conditions may sometimes make the reverse necessary.

528. The field lines connecting the various elements of a field army form one system, which is controlled from field army headquarters. The lines from the division commander to his subordinates form a separate system, which is controlled from division headquarters. Interference with any part of either of these systems by others than those charged with their control may cause serious complications. Stations will therefore not be closed or moved, nor will lines be discontinued without directions from the source of control. When, under exceptional circumstances, it becomes necessary to move or close a station or discontinue a line, a brief report of the proposed action will be made before the change is accomplished, when practicable; otherwise a report of the circumstances will be made as soon thereafter as practicable.

529. Whenever practicable, a reserve of equipment will be kept on hand to provide for a sudden move of the headquarters or other station. For this reason the company commander must take every opportunity to reel up wire no longer used. This can often be done as the action progresses or after a move of headquarters.

530. Brigade and subordinate commanders will ordinarily provide their own internal communication.

531. Signal officers will endeavor to inform themselves of the tactical situation and the plans of their commanding officer before establishing a field line. Field lines should never be established without an order from competent authority when it is not impracticable to obtain such an order.

532. When a wire line is discontinued, every effort will be made to recover the wire, and wire or material will not be abandoned unless its recovery has become impracticable.

Buzzer wire will be used for short lines where it is impracticable or unsafe to lay a line with the wire cart, because such lines are hard to see and easily broken.

533. When lines are laid within the zone of fire or observation of the enemy, the men laying the lines will take advantage of cover to conceal their position and movements. Sections should not be placed in positions exposed to the enemy, nor, on the other hand, in places where it will be difficult for those for whose use the line is established to find them readily.

534. Messages transmitted over all lines of information will be written on the prescribed message blank. The time and place of sending and receiving will be accurately noted, and messages will be numbered, checked, and recorded, and a carbon copy thereof retained, in accordance with the regulations prescribed therefor.

535. The following message blank is prescribed for the transmission of messages in the field:

<table>
<tr><td>U. S. Army Field Message.</td><td rowspan="2">No.</td><td>Sent by.</td><td>Time.</td><td>Rec'd by.</td><td>Time.</td><td>Check.</td></tr>
<tr><td rowspan="2">Communicated by buzzer, phone, telegraph, wireless, lantern, helio, flag, cyclist, foot messenger, mounted messenger.
Underscore means used.</td><td colspan="5">This space for signal operators only.</td></tr>
<tr><td colspan="6">From......(name of sending detachment here).
At......(location of sending detachment here).
Date........ Hour........ No. ....</td></tr>
</table>

To--

Received--

This blank is 4⅝ by 6¾ inches, including the margin on the left for binding. The back is ruled in squares and provided with scales for use in making simple sketches explanatory of the message. It is issued by the Signal Corps in blocks of 40 with duplicating sheets.

536. The regulation envelope is 3 by 5¼ inches, and is printed as follows:

U. S. ARMY FIELD MESSAGE.

To____________________________ No.____________________________
(For signal operators only.)

____

When sent____

Name of operator____

When and by whom received______________________________________
This envelope will be returned to bearer.

537. Whether a message shall be sent by signaling or messenger will be determined by the length of the message and the distance to which it is to be sent.

538. Messages will be transmitted in the order of their filing. When under exceptional circumstances an officer filing a message considers it necessary for his message to have precedence over messages previously filed, he will be informed by the operator of this general rule, and that it can only be violated by direction of the commanding officer for whose use the station has been established.

539. The right to the use of the line between several operators shall be determined by the signal officer or operator in charge of the central station.

540. In cases permitting of no delay whatever in the transmission of a message, the use of the wire will be obtained by means of the signal "9."

CHAPTER II.—INSTRUCTION IN GARRISON.

General Rules.

541. Instruction in The School of the Soldier, dismounted, mounted, and in signaling, will be conducted simultaneously, with the exception that telegraphy will not be taught until the recruit is proficient in the Myer code. Short drills in each will be carried on to avoid undue fatigue.

542. Signaling instruction will include visual signaling, telegraphy, the simple principles involved in construction, operation, and repair of the electrical instruments used in the company, with a complete training in Signal Corps field duties. Only men capable of taking the advanced course in electricity will be given it; and these with a view to promotion to first-class sergeants and master signal electricians.

The Signal Corps manuals will be used in company and post schools; and for advanced work such additional textbooks in electricity and aeronautics as may be prescribed by higher authority.

543. All men excepting cooks and mechanics will be instructed in visual signaling, as far as practicable.

Such men as show adaptability for the work will be given a course in wireless telegraphy.

Visual Signaling.

544. The recruit will first be taught the alphabet in the Myer code, with numerals, abbreviations, and conventional signals, the correct positions of the flag, and the correct method of setting up and adjusting the heliograph and lantern.

545. The Myer code, abbreviations, and conventional signals:

A	22	O	21
B	2112	P	1212
C	121	Q	1211
D	222	R	211
E	12	S	212
F	2221	T	2
G	2211	U	112
H	122	V	1222
I	1	W	1121
J	1122	X	2122
K	2121	Y	111
L	221	Z	2222
M	1221	tion	1112
N	11		

NUMERALS.

1	1111	2	2222
3	1112	4	2221
5	1122	6	2211
7	1222	8	2111
9	1221	0	2112

ABBREVIATIONS.

a	after	t	the
b	before	u	you
c	can	ur	your
h	have	w	word
n	not	wi	with
r	are	y	yes

CONVENTIONAL SIGNALS.

End of word	3
End of sentence	33
End of message	333
Numerals follow (or) numerals end	xx3
Signature follows	sig 3
Error	12 12 3
Acknowledgment, or "I understand"	22 22 3
Cease signaling	22 22 22 333
Cipher follows (or) cipher ends	2122 121 3
Wait a moment	1111 3
Repeat after (word)	121 121 3 22 3 (word)
Repeat last word	121 121 33
Repeat last message	121 121 121 333
Move a little to right	211 211 3
Move a little to left	221 221 3
Signal faster	2212 3

Visual Stations.

546. Signal parties should consist of four men, equipped with the necessary visual signal equipment for the operation of one station. The instructor indicates the point where the station is to be established and the location of the station or stations with which communication is to be conducted.

547. At the command *open station,* the signal equipment is made ready for use.

One man is designated to record incoming messages and to call off the words of the message being sent.

A second man manipulates the sending apparatus and reads and calls off incoming messages for the recorder.

A third man watches the distant station for breaks.

A fourth man is horse holder and messenger.

The duties of each will be varied until all are familiar with various duties.

548. The Myer code will always be used with the flag, and the alphabet and conventional signals will be thoroughly mastered by means of wand drill before any effort is made to do outside work. This instruction will be conducted at such time and in such schools as prescribed by the company commander or higher authority.

549. The Morse code will be used with heliograph and lantern. Instruction in the use of these will only be given after the recruit has made satisfactory progress with the buzzer.

550. Signal Corps Manual No. 6 will be used for further instruction in visual signaling.

551. The outside or field work will be conducted by sections, which may be divided into convenient squads of four. Chiefs of sections and their assistants will be the instructors. These units lend themselves readily to the use of the flag, heliograph, and lantern, as well as for convenience in camping.

Telegraphy.

552. The ability to telegraph by means of the Morse code is the most important qualification for men of the Signal Corps.

553. Instruction in telegraphy will be conducted in classes, under the direction of the company commander, by competent noncommissioned officers, and, when practicable, under the personal supervision of a commissioned officer. In this instruction the buzzer will be used and the men will be classified according to ability and progress. Instruction will of necessity be conducted indoors until the operator is sufficiently advanced to work to advantage on field lines, which should be indicated by his ability to send and receive about 15 words per minute under service conditions.

Such men as have no adaptability for operating, or such as are not sufficiently educated, will not be given this instruction.

Instruction in telegraphy will not commence until the recruit is thoroughly familiar with the Myer code and flag signaling.

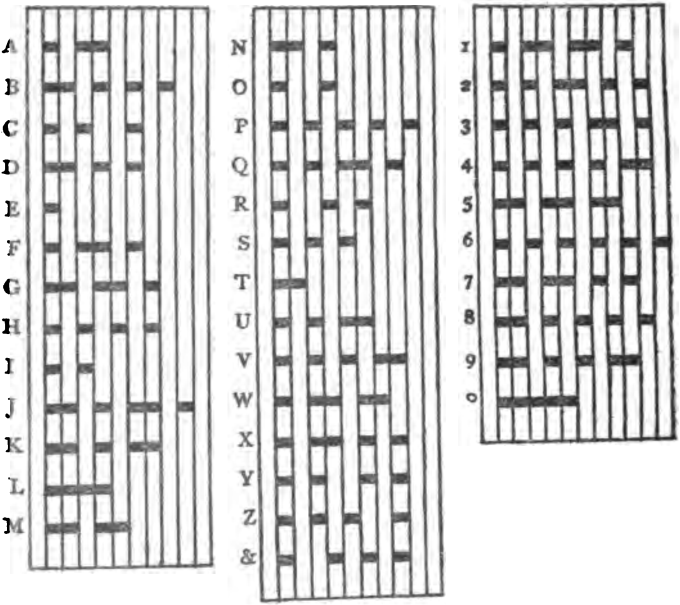
554. Instruments will be provided in barracks so that they are accessible to the men at all times. The ambitious will make rapid progress under such circumstances. The Morse code will be exclusively used.

Opportunity will be given men to use typewriters when they have progressed sufficiently.

555. The Morse code as used in the Signal Corps consists of seven elements: (1) the dot; (2) the dash; (3) the long dash;

(4) the ordinary space; (5) the letter space; (6) the word space; and (7) the sentence space. It is important to remember that the value of the spaces in the code is as great as that of the dots and dashes. The complete code is shown in plates 21 and 22.

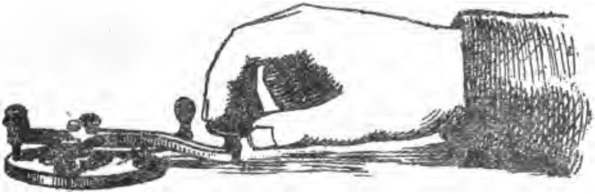
ALPHABET AND NUMERALS.



556. The arbitrary unit of time in this code, which, when written down becomes a unit of length, is technically termed the dot. An appreciable time is required for the production of signals by electricity, in the magnetization of the electromagnet, and in the movement of clockwork. The formation of a dot, therefore, necessarily involves time. Assuming, therefore, that—

(1) The dot is the unit of time.
(2) The dash is equal to two dots.
(3) The long dash is equal to four dots.
(4) The ordinary space between the elements of a letter is equal to one dot.
(5) The letter space is equal to two dots.
(6) The word space is equal to three dots.
(7) The sentence space is equal to six dots.

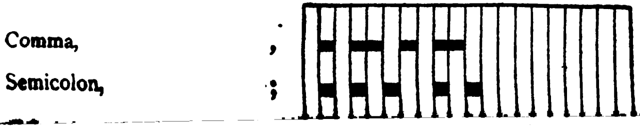
557. The recruit will first thoroughly commit to memory the groups of signs representing the letters of the alphabet, the numerals, and the principal punctuation points, viz., the period, the comma, and the point of interrogation. The remaining characters can be learned afterwards, as they will be little needed by the beginner.



558. The most approved manner of grasping the key, and one which has been employed by some of the most successful, experienced, and rapid operators, is shown in plate 23. Curve the forefinger, but do not hold it rigid. Let the thumb press slightly in an upward direction against the knob. Keep the wrist well above the table. No better general direction can be given than that the key will be grasped, held, and controlled with the same flexible but perfectly controlled muscular action of the fingers, wrist, and forearm with which the skilled penman holds his pen. Carefully avoid tapping upon the knob of the key; the raising spring should assist the upward motion of the key, but should never be permitted to control it.

559. By constant drill, as hereinafter directed, the habit of making dots with regularity, uniformity, and precision must

PUNCTUATION. ETC.



first be acquired; then dashes, and lastly, in order, group of dots and dashes, letters and words. In commencing, the habit should at once be acquired of making the dots like short, firm dashes. The recruit should learn to form the conventional characters accurately and perfectly; speed will come in good time, but only as a result of constant and persistent drill.

Elementary Principles.

560. As a basis for practice, the code may be regarded as comprising six elementary principles, viz:

First principle. *Associated dots.*

I S H P 6
. . . .

Second principle. *Associated dashes.*

M 5 ¶
– – – – – – – – –

Third principle. *Isolated dots.*

E
.

Fourth principle. *Isolated dashes.*

L or cipher T
— –

Fifth principle. *Dot followed by dash.*

A
. –

Sixth principle. *Dash followed by dot.*

N
– .

561. The learner will first practice upon the above elementary principles.

Make dots with the key at uniform and regular intervals, until they can be produced with the precision of a machine and of definite and uniform dimensions.

Next make dashes, first at the rate of about one per second, which speed may be increased by degrees, as skill is acquired by practice, to three per second. Make the space interval between successive dashes as short as possible. If the upward movement which forms the space be made full, it can not be made too quickly.

The third principle occurs but once, and needs no specific directions.

The fourth principle will be found somewhat more difficult to execute. The usual tendency is to make T too long and L too short. Theoretically, the cipher is one-half longer than L, but in fact it is always made the same, as the practice has been found to occasion no inconvenience. Occurring alone or among other letters, it is translated as L, but when found among figures it is read as 0.

The fifth principle forms the letter A. The usual tendency is to separate the two elements too much.

The dash followed by a dot (N) is usually found to be somewhat difficult. Time the movement by pronouncing the word ninety, sounding the first syllable fully. Guard especially against the usual tendency to separate the elements by too great a space.

562. Having become thoroughly familiar with the principles, the following exercises may with advantage be taken up in order:

E	I	S	H	P	6
.	. .	. . .	. . . .	. . . . .	. . . . . .

These should be practiced repeatedly until the correct number of dots in each character can be certainly made at every trial. A habit once formed of making the wrong number, usually one or two too many in the case of H, P, and 6, is almost impossible to eradicate. Guard especially against the objectionable habit of shortening or clipping the final dot, a vice which leads to innumerable and vexatious errors and misreading signals.

T	M	5	¶
—	— —	— — —	— — — —

The faults to guard against particularly in this exercise are shortening or elongating the terminal dash, and separating the successive dashes by too great a space interval.

A	U	V	4
- —	- - —	- - - —	- - - - —

The usual tendency to allow too much space between the dot and dash in the above letters may be overcome by forming them as by an elongation of the final dot in I, S, H, and P.

I	A	S	U	H	V
- -	- —	- - -	- - —	- - - -	- - - —

Practice these characters in pairs, that the distinction between them may be more firmly impressed upon the mind.

N	D	B	8
— -	— - -	— - - -	— - - - -

The student who has mastered the sixth principle will find no difficulty with the above characters.

A	F	X	,
- —	- — -	- — - -	- — - —

W	1
- — —	- — — -

U	Q	2	Period
- - —	- - — -	- - — - -	- - — — - -

3
- - - — -

These are similar to preceding exercises, and present no new difficulties.

K	J	9	7
—·—	—·—·	—··—	——··

J and K are usually considered the most difficult letters in the code. Avoid the tendency to separate J by a space into double N, and be careful that the dashes are of equal length. The numerals 7 and 9 require some care to insure correct spacing.

O	R	&	C
· ·	· ··	· ···	·· ·

Z	Y
··· ·	·· ··

These are termed the space letters, and the utmost care and diligent practice are necessary in order to form them accurately. The ability to transmit the spaced letters with absolute correctness is the test of a strictly first-class sender. The space should be just enough in excess of that ordinarily used between the elements of a letter to enable the letters intended to be made to be distinguished with certainty from I, S, and H. The most usual tendency is to make the space too great, even in some cases as great as the space between letters. This is a most fruitful source of misapprehension and error, and too much pains can not be taken to acquire and maintain correct habits in this particular.

Methods of Practice.

563. In transmitting words containing groups of two or more spaced letters, careful operators are accustomed to slightly increase the spacing between successive letters of the group.

Practice in transmission from miscellaneous manuscript is strongly recommended. The ability to read all kinds of copy—good, bad, and indifferent—correctly at sight is a most valuable one, and it is not difficult to acquire by attention and experience.

If the principles here laid down be firmly adhered to, the learner will find much reason for encouragement not only at the rapidity with which he will master what at first sight appears to be a very difficult undertaking, but the extreme accuracy with which he will be able to manipulate his instrument after a fair amount of practice.

This art can only be acquired by constant and persevering practice, keeping in mind the principles above given.

564. In learning to read by sound, it is advisable for two persons to practice together, taking turns at reading and writing, and each correcting the faults of the other. The sounds of the code characters must first be learned separately and then short words chosen, which must be written very slowly and distinctly and well spaced, the speed of manipulation being gradually increased as the student becomes more proficient in reading.

565. When the operator has made sufficient progress, he will be given instruction in checking messages, the conduct of offices, the care, adjustment, and repair of instruments.

Checking the Message.

566. In preparing the "check" of the message, all words and figures written in the address, body of the message, and the signature will be counted. That is, count all words after *to* to the end of the signature. The word "sig." is sent merely to indicate that the signature follows, and is not counted in the check.

In counting the check of a message, all words, whether in plain English, code, or cipher, pronounceable or unpronounceable, or initial letters, will be counted each as one word. The abbreviations for the names of places, cities, towns, villages, States, Territories, and Provinces will be counted as if written in full. In the names of towns, counties, countries, or States all of the words will be counted.

Abbreviations of weights and measures in common use and cardinal points of the compass will be counted each as one word.

Figures, decimal points, and bars of division, and letters will be counted each separately as one word.

In ordinal numbers, the affixes st, d, nd, rd, and th will each be counted as one word.

CHAPTER III.—INSTRUMENTS.

The Buzzer in Telegraphy and Telephony.

567. We are able with a few dry cells to operate an interrupter and coil which transforms the interrupted primary current driven by a few volts of the cells into a smaller current driven by a much greater alternating voltage of a frequency that gives a high note in the telephone receiver. This current is capable of efficient use over very leaky and high-resistance lines when a telephone receiver is the instrument used at the distant station. The efficiency of the buzzer depends equally upon the delicacy of the instrument at the receiving end. The telephone receiver is an instrument of marvelous sensitiveness to currents of higher acoustic frequencies.

568. The buzzer requires no adjustment at the receiving end. Leaks, bad connections, and high resistances, any one of which would cause loss of some or all of the signals on Morse instruments, simply affect the loudness of the signals in the receiving buzzer.

From its construction and mode of operation it may be appreciated how we may substitute a telephone transmitter for the key, and produce variation in its resistance by the voice instead of interruptions by the vibrator and key, thus instantly converting the telegraph into a telephone station. This feature alone is of great importance, especially on instruments for operating tactical lines.

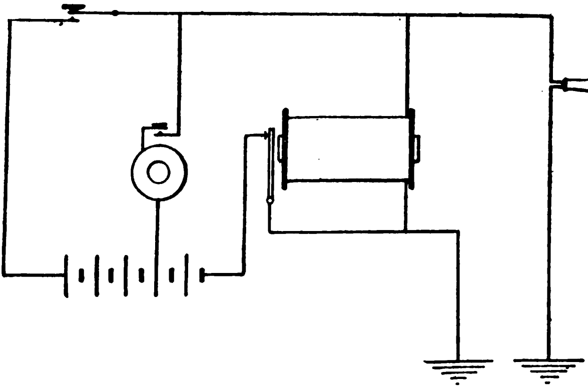
569. The delicacy of the telephone receiver makes telegraphy possible over lines long after Morse operation has ceased. On short lines with good insulation the sound is loud enough to be heard for several feet or more. As the resistance of the line rises or the insulation decreases, or both, the sound becomes fainter, but operation remains possible, even with very weak sounds. The principle of operation is shown in the elementary diagram of circuits of the field buzzer in plate 24.

The Field Buzzer.—Model 1908.

570. This buzzer is 8¾ inches in length, 6¼ inches deep, and 5½ inches wide, all outside measurements. It weighs 9½ pounds.

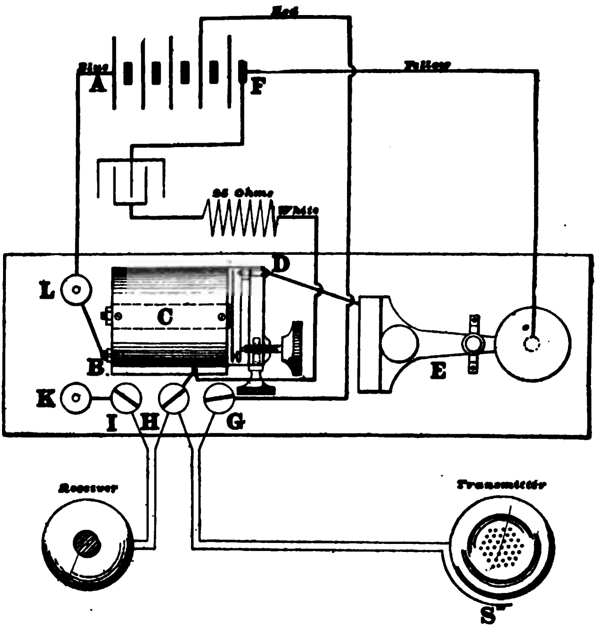
It contains five 4–0 dry cells in the back compartment. At one end of this compartment is a small condenser and resistance coil in series which are bridged across the interrupter. This compartment is closed by a hinged lid. The front and lower compartment holds a telephone receiver and transmitter.

This is covered with a hard rubber plate, hinged at one end, which carries on its top an interrupter and key, and line and ground binding posts at the hinged end. The interrupter contains a single coil of about 9 ohms resistance, the coil having



an iron core and jacket, and is provided with a vibrating tongue and platinum-tipped contacts at the interrupter points. When the key is pressed the battery current passes through the key, coil, and interrupter contacts, which vibrate at the rate of several hundred times per second. The interruption causes high-voltage pulsating currents to go out through binding posts to line and ground through the telephone receiver and distant stations. The buzzer parts are inclosed in a strong leather case with hinged top, making a compact and serviceable instrument for field use.

571. The wiring diagram of the buzzer is shown in plate 25. When the key is depressed, the current starting from the battery at A goes to the coil terminal at B, through the coil C into



FIELD BUZZER, MODEL 1908.

the metal jacket and S-shaped spring through the interrupter and out at D through key E, back to battery at F.

The high-voltage currents come out of the coil at B and H, to the line through L, and to the ground through the telephone receiver I and K.

Transmission of Information.

The small condenser and 25-ohm coil shunt the interrupter and prevent sparking.

The transmitter can be put into circuit in place of the key by pressing the button S. When this is done only two of the five cells are in action. The circuit otherwise is the same as when the key is depressed.

In receiving, the currents come over the line through L, B, coil C, H, receiver I, and to ground through K.

572. Some older types of field buzzers remain in service which are bulkier and heavier than that described. They use the same form of coil, interrupter, key, dry cells, and telephone receiver. The transmitter is somewhat different in pattern.

The adjustments and circuits described apply substantially to them also.

The Cavalry Buzzer.

573. This instrument is 5 inches in length, 7¼ inches deep, and 3 inches wide; it also has a cylindrical leather pouch 6 inches in length and 3 inches in diameter, which contains the receiver and transmitter; it is attached by a carrying strap to its side. The above are outside measurements. It weighs 5½ pounds.

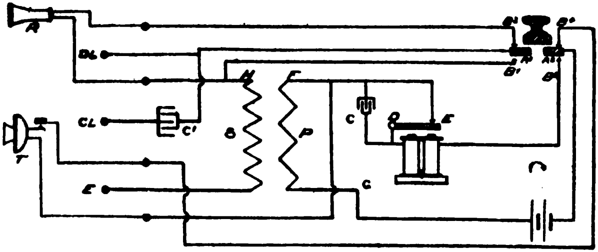
This buzzer was not constructed to be used extensively as a telegraph instrument. Its principal use will be as a telephone. While the button on top may be used as a telegraph key, its principal function is as a call on the telephone line.

It has an extra binding post, so connected to a condenser that the buzzer can be used on a telegraph line without interfering with the business of the line. In such a case the line wire should be connected to the condenser post.

This instrument will stand rough usage and will need very little attention from the repairman, except renewal of battery occasionally; but if it does get out of order, it is hard to repair, due to the delicacy of its parts and its compactness.

574. A simplified diagram of the circuits in the cavalry buzzer is shown in plate 26.

Two small dry cells in one case furnish the current, and these automatically connect with the circuit by means of spring contacts. When the key A-2 B-2 is depressed, the current runs through the primary of the induction coil P and then through the contact E and small electromagnet of the interrupter. A small condenser C–2 shunts the interrupter break. Thus there are produced rapidly alternating currents of comparatively high voltage in the secondary S which go out on the line through D L and to the distant telephone receiver. There is a second key A–1 B–1 so arranged that when the current-controlling key is depressed the second key puts the secondary coil to the line, cutting out the home telephone receiver, and thus prevents loud buzzing in the operator's ears from his own instrument.



575. A condenser C–1 is provided in an alternative path to line through C L which permits of attaching a buzzer directly to the telegraph line. The condenser freely permits passage of the voice or buzzer currents, but blocks those of the telegraph, thus not interfering with its operation.

576. The buzzer is provided with a transmitter T in the same way as the field buzzer, and by depressing the talking switch the set is converted into a local battery telephone.

To Use the Buzzer as a Telephone.

577. The key is closed and opened several times to draw the attention of the operator at other stations. The operator at the calling station calls the letter or call letters of the station wanted, signing at intervals his own call; when answered, informs the station called to use the telephone, which is done by sending the word "fone."

To use the telephone press the button on the transmitter while talking and hold it vertically. If held horizontally the granulated carbon in the receptacle of the transmitter may not touch the front carbon disk, thus opening the circuit.

Care of Buzzers—Location of Faults and Adjustments.

578. A buzzer used at a station, such as at a tent in the camp, will cause but little trouble. The buzzer, however, carried by operators in sections gets out of order at times, due to being jarred while carried on horseback, especially when traveling at the faster gaits. This can frequently be obviated by seeing that all connections are tight, and that the cells are packed firmly with excelsior or some other suitable material before leaving camp.

If the battery is not well packed and an operator rides 10 or 12 miles at a trot, some of the wires connecting the cells will probably be broken or jarred loose from the cells, and possibly the connections to the condenser and coil will be loosened or broken.

The transmitter and receiver should be packed and not allowed to knock against each other and the sides and bottom of the compartments. The continual jarring for two or three hours at a time may loosen some of the set screws and even cause breaks in the cords.

The operator who takes proper care of his buzzer will seldom have to bring it to the repairman.

Location of Faults (Field Buzzer).

579. Sometimes even with all precautions the buzzer will not work. When such is the case, the first thing to do is to try and locate the trouble and remove it.

The trouble may be in the line, connecter, or in the buzzer.

First. See if the circuit is open at the interrupter just in front of the coil; the spring should touch the vibrator; if it does not touch, the circuit is open, and can be closed by slowly turning the screw, pressing against the spring to the right until the spring and vibrator touch; if a buzz is not heard when the key is closed or a click when it is opened, the trouble is probably somewhere else. Care will be taken to see that the contact points on the spring and vibrator are clean.

Second. Disconnect the connecter from the line wire and connect to the ground rod. If, after adjusting spring contact, by working the key no circuit can be obtained, short-circuit the line and ground posts. If still no sound is heard in the receiver by closing and opening the key, the trouble is without a doubt in the buzzer.

Third. Examine the battery, see that all connections between the cells are tight, use a voltmeter to test each cell for voltage. This to ascertain if any of the wires connecting the cells are broken inside the insulation.

If no circuit can be obtained after the battery has been gone over carefully, make an inspection of all the connections on the buzzer in general. Very likely a loose connection will be found somewhere.

The receiver can be tested by disconnecting the cords from the binding posts on the buzzer and touching them to the two poles of a cell. If a scratching sound is heard when touching the terminals of the cell, the receiver is in working order.

The transmitter and transmitter cords are in circuit only when the buzzer is used as a telephone.

580. Any circuit in the buzzer can be tested by using a dry cell or two in series with the telephone receiver. Using a lead wire from one side of the battery and one side of the receiver, and by touching the two wires to the points, which should be electrically connected, if no sound is heard in the receiver when touching these points the circuit between them is open.

As the resistance between any two points in the buzzer should be very low, the sound heard in the receiver should be loud, provided the cells used for the test are in good condition. If the sound is faint, the part tested is faulty. The fault may be due to a broken wire making partial connection, or to corrosion, dirt, or loose connection where the wire is connected to the binding post. Such connections under certain climatic conditions often become so corroded that they would entirely open the circuit if not inspected and cleaned occasionally.

Too much care can not be taken in regard to keeping all connections clean and tight. The satisfactory working of the buzzer will depend on it.

If the buzzer works poorly with a new, strong battery in it, there is something wrong, and the cause of trouble should be located and removed.

Adjustments.

581. The adjustment is made with the screw touching the spring which touches the armature or vibrator in front of the coil.

If clicks are heard when closing and opening the key, the spring is pressing too hard against the vibrator; hold the key down and turn the screw to the left until a suitable buzz is obtained. Loudness and clearness of tone are both desirable for the best results.

In case the spring does not touch the vibrator, turn the screw to the right until it does, as indicated by the sound in receiver.

Little trouble in adjustment will be experienced with a buzzer that has a good battery and all connections clean and tight; but when the battery is weak, with a high resistance in the buzzer circuit also, the adjustment becomes very difficult. The turning of the adjustment screw should be gradual. If turned fast it is nearly impossible to get good adjustment.

582. The adjustment and repair of the cavalry buzzer is governed by similar principles. See that the spring contacts in the top of the battery compartment touch the battery terminals. The adjustment of the small interrupter in the top of the case is somewhat delicate, but may be done readily with the small screwdriver in the case. It seldom goes out of adjustment. It should be remembered that when the *button* operates the buzzer the home receiver is cut out. By removing the top and pressing one of the key springs at a time, one of them will operate the home as well as distant buzzer. For complete test, the E and DL binding screws in the compound plug should be short-circuited for loudest effect.

Dry Cells.

583. The operation of all types of buzzers and electric flash lights depends upon the condition of dry cells used with them. Dry cells issued with the 1908 and some earlier types of field buzzers are of the "reserve" variety and the "4-O" size.

These are inactive until water is put in them after removing the small corks in the tops of the carbons. This should be done by pouring the water in carefully until it no longer sinks, then throwing out surplus and replacing the corks. The opening in the carbon should be filled at least 10 minutes, when the water will generally cease sinking. The cells should be in full operation within half an hour. The cells furnished for the cavalry buzzer and flash lights are all ready for operation when received, but they deteriorate in storage and, in general, are unserviceable after six months. The useful life of a dry cell depends upon the size, climate, date of manufacture (or moistening of "reserve" type), and the current drawn from it. In flash lights the current demand is heavy when the light is used, so the life of the battery is short if much use is made of the light. In buzzers, most of their failure is due to deterioration in storage or in the buzzer case.

The general tendency is to blame any failure of the buzzers on the dry cells, throw away those in the case without test, and substitute new ones. This practice should be rigorously checked.

The voltmeter test alone is not conclusive, especially when the voltage of one cell falls below 1.4. The test should be made *while the cell is sending current,* and if, after a few minutes of steady use, the voltage drops below 1.0 the cell is too far exhausted to be serviceable. The cavalry cells are connected in pairs in their cases and should give not less than two volts.

Field Wireless Telegraphy—General Principles.

584. Wireless telegraphy will be used when distance, the character of the service, and the nature of the terrain prevents the laying of wire lines. This is particularly the case in service with the cavalry. It may also be used to keep parallel columns in communication on the march, and possibly to intercept messages sent by the enemy or to interfere with the operation of his wireless station.

The locality for the station will be selected with as much care as the conditions permit. Open ground as far back from hills as practicable is to be preferred. The nearer to the commanding officer or his headquarters the headquarters station is placed the better. The range of the present pack set is from 15 to 20 miles.

General Description of Pack Wireless Set.

[1910 type.]

585. The set consists of:

(1) Two chests containing general operating apparatus.
(2) A jointed hollow wooden mast of seven sections, and one extra section.
(3) An antenna system of four three-ply stranded wires terminating in ropes, and a stranded lead wire fastened to a top insulator.
(4) A rubber-covered wire counterpoise of four wires.
(5) A hand-power generator.
(6) Two storage batteries (four cells each).
(7) A set of pack frames and leather bags fitting over the aparejos of the three mules that carry the equipment; (1) goes on one mule, (2), (3), and (4) on another, and (5) on another. When carried, (6) is put in two boxes that hook on the generator frame (5).

Transmitting and Receiving Apparatus.

586. In one of the chests is contained the induction coil, the Leyden-tube secondary condenser, and the spark gap.

587. In the other chest is placed the interrupter, key, primary condenser (under the base), the detector, and small receiving condenser in the box under the detector, and a tuning coil with sliding contacts. A spiral linking coil, small lamp, and connections for antenna and counterpoise are attached to the lid.

588. *Forty-foot mast equipment:* Seven sections of the 5½-foot length tubular mast are used, four of the larger at the bottom and three of the smaller at the top. The tube is permanently fixed in one end of each section, except the top one, making the section and the tube practically one piece, and this facilitates very much quick handling of the mast. A large glass, porcelain, or composition insulator is screwed on the bottom section, and is used at the bottom of the mast to insulate it from the ground.

589. ***Antenna:*** Four phosphor-bronze antenna wires are used, each 85 feet long. These wires are made up of three of the regular antenna wires plaited together. This gives more surface in the antenna, and prevents kinking. The guy ropes on the end of the antenna wires are 75 feet long and are insulated from the wire by four hard-rubber insulators placed in series. The antenna wires are secured to a metal piece on the insulator at the top of the mast. The lead wire, which is made up exactly like the antenna wires, is also fastened to this metal piece.

590. ***Counterpoise:*** The counterpoise consists of four pieces of cable core (seven-strand No. 20 copper wire, eight thirty-seconds to nine thirty-seconds rubber insulation) 100 feet long. These four wires are soldered together at the inner end, the outer ends being insulated. At the junction of the counterpoise wires a lead wire of this cable core is also soldered for connection with the instruments and this joint insulated with pure rubber or okonite tape.

591. The pack set should be insulated from the ground. Pins and spare parts should be placed near the base of the mast, so they will not be lost. The antenna is reeled up from outer ends by revolving the carriers. The counterpoise is reeled up from the center, the men drawing in the insulated wires and coiling them over the arm and hand. These precautions will prevent kinking the antenna and counterpoise wires. The steel joining tubes of the mast must be kept bright and well oiled.

591. Each member of the section will thoroughly familiarize himself with his particular duties. At the same time each member of the section will be given instruction in the various duties in putting up the mast.

592. To call a station, first listen in, and adjust detector and tuning coil to prevent interference. Then signal its call letter, signing your own call letter at intervals. In opening station the call will not be continuous, but will be at intervals of about three minutes, in order to give the other station a chance to answer. As soon as communication is established report to the signal officer. Firmly made distinct signals are especially necessary in wireless operation. Speed should be moderate, and no increase is to be made unless receiving is readily done.

When difficulties exist, it is safer and, in the end, more expeditious to repeat all messages at least once.

593. The sign "33" will be made when through sending, which means that you are going to switch over to the receiving side and listen in. Always change over from the sending side to the receiving side as quickly as possible, and adjust detector by means of the small buzzer furnished. When changing from the receiving side to the sending side always make several periods before commencing your message, in order to give the other station time to change over and get tuned.

594. It is generally useless and always dangerous to attempt to operate in a thunderstorm. Therefore in general during such a storm it is advisable to connect the antenna direct to the ground.

595. A wireless-telegraph operator must not only be able to send and receive messages, but must be familiar with the apparatus employed, in order to tune, adjust, overhaul, and make repairs. Wireless sections will have permanent call letters assigned. An accurate record of messages will be kept at each station, numbering them consecutively.

Instructions for Operating Field Wireless Pack Sets.

596. The diagram of circuits and arrangement is given in plate 27.

The various operations in sending and receiving are as follows:

In sending, the control switch is thrown to the right. The current from the generator or storage battery then starts the interrupter, coming in at A, to B through interrupter magnets C, to interrupter driving contact screw D, through small interrupter spring to vibrator K, to E, 1, over to control switch through F, and back to battery through G. This causes interrupter to vibrate continuously, but the main current, controlled by the key, is not yet on. When key is closed the main current goes on as follows: From A to B through primary of induction coil to I, through key and up to J and to large vibrator screw, through platinum point of this to large vibrator spring K, to E, to 1, to control switch, through F, and back to battery through G. The lower section of primary condenser shunts the contact points of the small vibrator through 4 and H on one side and

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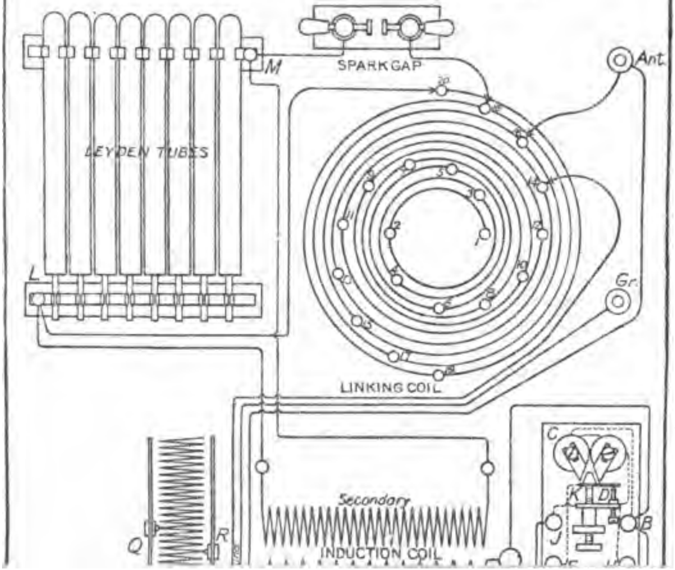
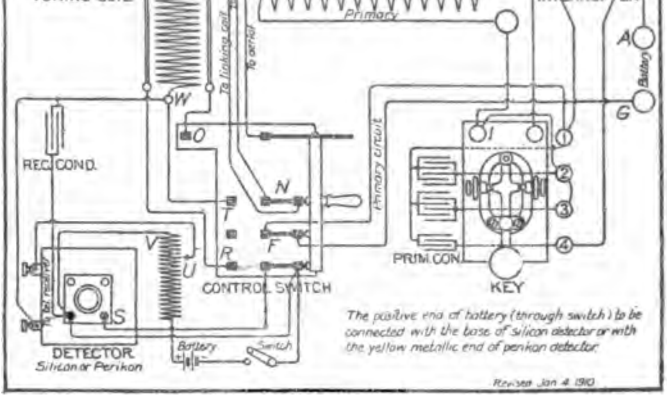
FIELD WIRELESS SET-PACK

WIRING DIAGRAM OF TRUNK TYPE, SET No 43





The positive end of battery (through switch) to be connected with the base of silicon detector or with the yellow metallic end of perikon detector.

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through 1 and E on the other. The two upper sections shunt the contact points of the large vibrator and key through 1 and E on one side and through 2, 3, and I on the other. The rapidly interrupted current in the primary coil induces high voltage impulses in the secondary. The Leyden tubes, connected in parallel, are joined across this secondary at L and M. Being charged at each interruption they discharge through the circuit formed by the spark gap and included turns of the linking coil, producing at each discharge the high frequency oscillations in the included turns in the linking coil. These induce the high frequency oscillations in the turns of the linking coil included between the antenna and ground connections. These currents go to ground or counterpoise from the linking coil, down to N on the control switch, and to ground through "Gr." Those to the antenna go directly to "Ant."

In receiving, the control switch is thrown to the left. The high frequency currents induced in the antenna by the waves from the distant station come in at "Ant." to control switch at O, to adjustable slider P on tuning coil, out at Q, through switch at R, and to detector at S, through detector, and up to "Rec. condenser," through this to T on the switch, and up to ground at "Gr." The telephone receiver shunts the condenser, including in its circuit the points U V of the potentiometer and the turns W Q of the tuning coil. The silicon or "Perikon" detector tends to rectify the high frequency currents. These, traversing the telephone receiver circuit, give the signals by causing vibrations of the diaphragm of the same acoustic frequency as the groups of waves corresponding to the interruptions or half periods in the primary of the induction coil or transformer.

By closing the small battery switch shown at the bottom of plate 27 we impart to the telephone receiver circuit, through the points U V, a portion of the voltage applied at the terminals of the potentiometer.

Sending Apparatus.

Power: Either of two sources of power may be used. Storage batteries and hand-driven dynamos.

Hand generator: When hand driven power is used, it should be steadily applied. Owing to resistance going off and on when operating the key, care should be taken to work handles with arms somewhat stiffened, so as to resist sudden increases in velocity. Such changes are apt to strain the interrupter or cause trouble with the primary condenser. A storage battery connected across the hand generator will do much to assist in smoothing the action. One of 16 volts and quite small capacity will serve. The connection should be made while dynamo is being slowly turned, and disconnected when through sending, otherwise the battery will be run down by driving the dynamo as a motor. The hand generator requires frequent cleaning and occasional oiling. If it fails to "pick up" when the handles are turned, it may be it is being turned in the wrong direction. If it still fails when turned in the reverse direction, the commutator and carbon brushes probably need cleaning, and, possibly, adjusting. Steady operation of the hand generator is desirable to prevent, on the one hand, too violent action of the interrupter and flaming, or, on the other hand, insufficient voltage to give a good spark.

Batteries: The most satisfactory used so far are the "Duro" dry-type storage. They should always be charged fully as soon as possible after receipt, at the rate of about 2 amperes. When standing they should have a setting-up charge at least once a month.

They have approximately 20 ampere hours' capacity, and, when freshly charged, will serve for about eight hours' continuous sending. They should never be permitted to stand long discharged. For transportation the soft-rubber stoppers should always be placed in the cells. Keep the rubber stoppers out during the charge and put in a spoonful of water.

Interrupter: The small contact should be screwed in until it just touches the spring, and will start when switch is placed at "send" position. Adjust until an amplitude of vibration of about one-half inch is reached, and then screw up small set screw on the side.

The large contact should be adjusted so that the large platinum tipped screw pushes in the spring contact about one-sixteenth inch. If the large contact sticks or flames up when key is depressed, it may be that it is screwed in too far or has been roughened by previous burning. In the latter case the platinum contacts should be sparingly dressed with a smooth file. Continued and violent flaming indicates an open circuit in the condenser shunting the interrupter or the connections therewith. Violent sparking at the key and none at spark gap indicates a short circuit in the condenser.

Key: Should be worked with a play of not less than three thirty-seconds inch. There is a tendency for it to stick, and this should be met by grasping the knob and working with an upward as well as downward stroke. When the interrupter sticks or flames badly the key should not be touched until interrupter is adjusted.

Control switch: The sending position is to the right, the receiving to the left.

Spark gap: Should in no case exceed one-quarter inch spark length. Between this and three-sixteenths inch gives the best effects. In the double spark gap each space should be about one-eighth inch. The spark should appear white and with some volume and give a sharp crackling sound. A hissing sound usually indicates that the spark is too short.

Linking coil: This is a flat spiral of rubber-covered wire with binding posts connected every half turn. These are numbered from 1 to 20, the adjoining half turns being connected to consecutive odd and even numbers.

Two high-frequency (oscillating) circuits are connected with the linking coil. The first, called the "closed oscillating" circuit, includes the spark gap and Leyden eight-tube condenser. The two spring clips leading from these can include one or more turns of the linking coil.

The "open oscillating" circuit leads at one side into the antenna connection, and at the other side to the binding post connected with the counterpoise wires. The clips from these are connected with one or more turns of the linking coil, and these may or may not include the turns already in the closed oscillating circuit.

When there are turns common to the closed and open oscillating circuits, the coupling is said to be "close," and when not the coupling is said to be "loose." To place the closed and open oscillating circuits in "tune" with each other, the small glow lamp in the hard-rubber socket should be connected in the wire leading to the antenna post. The closed and open oscillating circuits are then tried on various adjustments until the glow of the lamp is brightest.

On the linking coil it is advisable to start out with the closed oscillating circuit connected with 20 and 15, and the open oscillating clips connected with 20 and 14. Too many turns in the closed oscillating circuit are apt to make the spark ragged and red, and to cause flaming at the interrupter.

Receiving Apparatus.

597. ***Buzzer adjustment of the detector:*** A small commercial-type buzzer is connected with a dry cell and push button, and a wire from the buzzer connected to a bar of the receiving tuning coil. When the button is pushed and the buzzer operated, if the detector is in proper adjustment for receiving signals, the sound of the buzzer will be heard quite plainly in the telephone receiver when the wire is touched to the tuning coil.

Silicon detector: This is the detector usually furnished with pack sets.

In adjusting the detector:

1. Adjust the pressure of contact point by gently pressing the spring sleeve down on the cup contact until maximum response is obtained in the telephone receiver.
2. After clamping the sleeve in above position by the side screw, then slide the cup contact about to determine if the response can be improved. A very slight movement or tap will sometimes cause a great improvement in sensitiveness.

It is important in this detector that both the rounded contact point and the upper or polished surface of the cup contact be kept absolutely clean.

In case the rounded contact point becomes oxidized or otherwise tarnished, it should be cleaned by rubbing gently with very fine emery paper.

The upper or polished surface of the cup contact can be cleaned by rubbing with a piece of soft cloth, or, better, wiped with a clean cloth moistened with carbon bisulphide.

Under no circumstances rub the silicon with emery paper, as it will destroy the smooth surface.

In damp weather or in tropical climates, where a film of moisture tends to form on the polished surface of the cup contact, a layer of insulating oil, such as paraffin, may be spread on the surface. This will in no way affect the operation or adjustment of the detector, as the pressure of the contact point readily displaces the oil layer at the point of contact.

Perikon detector: This is used in a way similar to the silicon detector. The red crystals are quite friable, and in no case must the two contacts be rotated when in contact, as this would destroy the crystalline points.

A slight motion or tap will often bring out the signals clearly, especially at the beginning.

In both silicon and perikon detectors the battery must be connected in proper direction. In silicon, the positive is connected with the base, and with perikon to the metallic crystal side. The battery is not needed at moderate distances, but it improves the strength of signals when they come in faintly. In later types the battery circuit has been dispensed with.

In General.

598. Connections from the aerial circuit and counterpoise wires should not have any open loops in them. If there is any slack, it should be lashed up flat without having open loops, which seriously affect accurate tuning.

The conductor to the antenna should not come within several inches of the ground or counterpoise conductors. Particular care should be observed to have good clean connections in the storage-battery circuit.

It is essential that all metal and hard rubber of instruments should be kept clean and free from dust.

VISUAL SIGNALING APPARATUS.

The Flag Kit.

599. Two kinds of flag kits, the 2-foot kit and the 4-foot kit, are issued by the Signal Corps.

The 2-foot kit.—This kit consists of one white and one red signal flag, two three-jointed staffs, and a suitable carrying case to contain the outfit. The white flag is made of white muslin 2 feet square, with an 8-inch turkey-red muslin center. The red flag is of similar size and material, the only difference being an alteration of colors in the body and center. The means of attachment to the staff consists of a loop at the center and two ends of white tape at each edge of the back of the flag body. The staff is made of hickory in three joints, each 23 inches long, and is assembled by telescoping into brass ferrules. Brass eyes are provided on the first and second joints to receive the tape ends at the edge of the flag. The carrying case, of convenient size and shape to contain the two flags and staffs complete, is made of 8-ounce standard khaki bound with leather and fitted with a shoulder strap.

The 2-foot kit is essentially a practice kit, although under favorable conditions of weather and terrain it may be used to advantage as a short-distance service signaling outfit. Two of these kits are issued to each troop, battery, and company for the purpose of disseminating general instruction in military signaling throughout the Army.

The 4-foot kit.—This kit is of essentially the same description as the 2-foot kit, except as regards size. The flags are 3 feet 9 inches square, with 12-inch centers, and the staffs are considerably heavier, the joints being 36 inches long. The 4-foot kit is the standard field flag kit, and the range at which signals can be exchanged with it depends on a variety of factors, such as the condition of the weather, the location of station, the proficiency of signalmen, etc. The speed for continuous signaling is seldom greater than five to six words per minute.

600. *Care of flag material.*—Signal flags should be examined at the close of drill or practice and repairs made to any rents or loose ties discovered. Flags, when soiled, should be thoroughly washed and dried in the sun. Signals made by clean flags are much more easily read than those made by dirty ones. Staffs should be handled with care, especially when jointing or unjointing. Care should be taken not to bruise the ends of the brass ferrules. If a ferrule becomes loose on a staff it should be tightened without delay.

601. *Powers and limitations of flag signaling.*—The advantages which may be claimed for this method of signaling are portability of apparatus, adaptability to varied weather conditions, and great rapidity of station establishment. The disadvantages are the lack of celerity of the signals, their impenetrability to dust or smoke, and the comparatively short ranges at which they can be read.

The Heliograph.

602. The heliograph is an instrument designed for the purpose of transmitting signals by means of the sun's rays.

Description.—The service heliograph equipment of the Signal Corps consists of:

A sole-leather pouch with shoulder strap containing—
  1 sun mirror } inclosed in a wooden box.
  1 station mirror }
  1 screen, 1 sighting rod, 1 screw driver.
A small pouch, sliding by two loops upon the strap of the larger pouch, containing 1 mirror bar.
A skeleton leather case containing 2 tripods.

The mirrors are each 4½-inch squares of plate glass supported by sheet-brass and cardboard backings, and mounted in brass retaining frames. At the center of each mirror there is an unsilvered spot three thirty-seconds of an inch in diameter, and holes corresponding to these spots are drilled in the backing. The sun mirror differs from the station mirror only in that it has a paper disk pasted upon its face covering the unsilvered spot. The mirror frames are carried by brass supports provided at the bases with conical projections accurately turned to fit the sockets of the mirror bar and grooved at the ends to receive the clamping spring. Each support is fitted with a tangent screw and worm-wheel attachment functioned to control the motion of the mirror frame about its horizontal axis.

The mirror bar is a bronze casting provided at the center with a clamp threaded to fit the screw of the tripod. By releasing the clamp the bar may be moved independently of the screw and adjusted to any desired position. Conical sockets for the mirror supports are provided for at the ends of the mirror bar. These sockets work freely in the bar and, being actuated by a tangent screw and worm wheel, serve to regulate the motion of the mirror frame about its vertical axis. Clamp springs, for engaging and securing the ends of the mirror frame supports, are attached at each end of the bar.

The screen is a brass frame 6½ inches square, in which six segments or leaves are mounted in such a way as to form a shutter. The leaves are designed to turn through arcs of 90° on horizontal axes, unanimity of movement being secured by connections made with a common crank bar. The crank bar is operated by a key and retractile spring, which serve to reveal and cut off the flash. A set screw and check nut at the lower edge of the screen frame limits the motion of the crank bar and the opening of the leaves. A threaded base support furnishes the means of attaching the screen frame to the tripod.

The sighting rod is a brass rod 6½ inches long, carrying at the upper end a front sight and a movable disk. About the rod is fitted a movable bronze collar, coned and grooved to take the socket and clamping spring of the mirror bar. A milled edged bronze washer serves to clamp the collar to the rod at any desired point.

The tripods are similar in all respects, the screw of either threading into the mirror bar or screen frame. Each tripod is provided with a hook at the base of the head, allowing the suspension of a weight when great stability is required.

603. ***Assembling.***—There are two ways of assembling the heliograph, and the position of the sun is the guide in determining which of the two should in any given case be employed. When the sun is in front of the operator—that is, in front of a plane through his position at right angles to the line joining the stations—the sun mirror only is required; with the sun in rear of this plane both mirrors should be used. With one mirror the rays of the sun are reflected directly from the sun mirror to the distant station; with two mirrors the rays are reflected from the sun mirror to the station mirror, and thence to the distant station.

604. ***With one mirror.***—Firmly set one of the tripods upon the ground; attach the mirror bar to the tripod; insert and clamp in the sockets the sun mirror and sighting rod, the latter having the disk turned down. At a distance of about 6 inches, sight through the center of the unsilvered spot in the mirror and turn the mirror bar, raising or lowering the sighting rod until the center of the mirror, the extreme point of the sighting rod, and the distant station are accurately in line. Firmly clamp the mirror bar to the tripod, taking care not to disturb the alignment, and turn up the disk of the sighting rod. The mirror is then moved by means of the tangent screws until the "shadow spot" falls upon the paper disk in the sighting rod, after which the flash will be visible at the distant station. The "shadow spot" is readily found by holding a sheet of paper or the hand about 6 inches in front of the mirror, and should be constantly kept in view until located upon the disk. The screen is attached to a tripod and established close to, and in front of, the sighting disk, in such a way as to intercept the flash.

605. *With two mirrors.*—Firmly set one of the tripods on the ground; clamp the mirror bar diagonally across the line of vision to the distant station; clamp the sun mirror facing the sun to one end of the mirror bar and the station mirror facing the distant station. Stooping down, the head near and in rear of the station mirror, turn the sun mirror by means of its tangent screws until the whole of the station mirror is seen reflected in the sun mirror and the unsilvered spot and the reflection of the paper disk accurately cover each other. Still looking into the sun mirror, adjust the station mirror by means of the tangent screws until the reflection of the distant station is brought exactly in line with the top of the reflection of the disk and the top of the unsilvered spot of the sun mirror; after this the station mirror must not be touched. Now step behind the sun mirror and adjust it by means of the tangent screws so that the "shadow spot" falls upon the center of the paper disk on the station mirror.

The flash will then be visible at the distant station. The screen and its tripod are established as described in the single mirror assembling.

606. *Alternate method with two mirrors.*—Clamp the mirror bar diagonally across the line of vision to the distant station, with the sun mirror and the station mirror approximately facing the sun and distant station, respectively.

Look through small hole in sun mirror and turn the station mirror on its vertical and horizontal axes until the paper disk on the station mirror accurately covers the distant station.

Standing behind sun mirror, turn it on its horizontal and vertical axes by means of the tangent screw attachments until the shadow spot falls upon the paper disk on station mirror.

607. *Adjustment.*—Perfect adjustment is maintained only by keeping the "shadow spot" uninterruptedly in the center of the paper disk, and as this "spot" continually changes its position with the apparent movement of the sun, one signalman should be in constant attendance on the tangent screws of the sun mirror. Movement imparted by these screws to the mirror does not disturb the alignment, as its center (the unsilvered spot) is at the intersection of the axes of revolution. Extra care bestowed upon preliminary adjustment is repaid by increased brilliancy of flash. With the alignment absolutely assured and the "shadow spot" at the center of the disk, the axis of the cone of reflected rays is coincident with the line of sight and the distant station receives the greatest intensity of light. Remember the distant observer is unquestionably the better judge as to the character of the flash received, and if, therefore, adjustment is called for when the "shadow spot" is at the center of the disk, the alignment is probably at fault and should be looked after at once. In setting up the tripods always see that the legs have a sufficient spread to give a secure base, and on yielding soil press firmly into the ground. Keep the head of the tripod as nearly level as possible, and in high wind ballast by hanging a substantial weight to the hook. See that the screen completely obscures the flash, also that the flash passes entire when the screen is opened. This feature of the adjustment is partially regulated by the set screw attached to the screen frame. The retractile spring should sharply return all the leaves of the screen to their normal position when the key is released. Failure to respond promptly is obviated by strengthening or replacing the spring.

608. *Care of apparatus.*—Minor parts of the instrument should be dismounted only to effect repairs, for which spare parts are furnished on requisition. Steel parts should be kept oiled and free from rust. Tangent screws and bearings should be frequently inspected for dust or grit. Mirrors should invariably be wiped clean before using. In case of accident to the sun mirror the station mirror can be made available for substitution therefor by removing the paper disk. If the tripod legs become loose at the head joints, tighten the assembling screws with the screw driver.

609. *Power and limitations of the heliograph.*—Portability, great range, comparative rapidity of operation, and the invisibility of the signals except to observers located approximately on a right line, joining the stations between which communication is had, are some of the advantages derived from using the heliograph in visual signaling.

The principal disadvantage results from the entire dependence of the instrument upon the presence of sunlight. The normal working range of the heliograph is about 30 miles, though instances of its having attained ranges many times greater than this are of record. The heliograph can be depended upon to transmit from 5 to 12 words per minute.

The Acetylene Lantern.

610. The signal lantern is an instrument designed for the purpose of transmitting signals by means of intermittent flashes of artificial light. It is the standard night visual signaling equipment furnished by the Signal Corps, and depends for its illumination upon the combustion of acetylene gas.

611. *Method of gas generation.*—The method employed for producing acetylene in the signal lantern is by bringing water into contact with calcium carbid.

612. *Description.*—This equipment consists of a signal lantern, with cartridge generator attached. The lantern is equipped with a special aplanatic mirror, 5 inches in diameter and about 3 inches focus. The lantern is packed complete in a wooden case with shoulder straps, and the following extra parts are included, each part having its own receptacle in the case: Two burners, 1 cover glass, 3 cartridges of calcium carbide of 5 ounces each, 1 pair of gas pliers, 1 tube white lead, 1 extra filter bag, 1 screw driver.

The lantern is made of brass, all parts of which are riveted. The burner is of the double-tip form, consuming three-quarters of a cubic foot per hour. The lantern is fitted with a hood to provide proper ventilation and at the same time to prevent the flickering of the light by the wind. The front door of the lantern is hinged and fastens with a spring clasp; it is so arranged that it can be entirely removed if necessary. The cover glass is made in three sections and is not affected by the expansion and contraction of the metal due to changes in temperature. The glass is fastened by the aid of a spring wire, so that it can be readily removed if it is necessary to replace a broken section. In the base of the lantern is a key and the adjustment for regulating the height of the flame. The key is so arranged that when not depressed but little gas is admitted through the by-pass to the burner, and the flame is low. By depressing the key as much gas as can be entirely consumed is admitted to the burner, which gives a bright flash. At the back of the lantern there is an adjustable handle, so that the equipment can be used as a hand lantern if desired. This form of lantern can be used with the regular heliograph tripod, the generator being either attached to the back of the lantern or suspended. When practicable, it is better to attach the generator to the lantern. The candlepower of this lantern is about 1,900.

The generator used is known as "the cartridge generator," and while constructed on the water-feed principle, the disadvantages incident to this method are eliminated as far as possible. It is constructed of brass and has a removable top. Attached to the inside of the top is a flexible frame with a spring latch, the spring latch being hinged. At the top of the frame is a tube or cylinder, the bottom of which is conical in shape and covered by a rubber plug. At the bottom of the frame is a hollow tube, which is the'water inlet. The cartridge proper consists of a tin cylinder having an opening at either end. A small cylinder of wire mesh extends from and connects these openings. The carbide lies around this mesh on the inside of the cartridge. The rubber plug before mentioned fits into the upper opening and the water tube into the lower opening. Inside the tube, at the top of the frame, is a filter, the function of which is to remove the dust and moisture from the gas. The outlet from this chamber is by a brass bent tube having a stopcock attached thereto.

613. The principal things to observe in the operation of this generator are the following:

(1) To see that the rubber plugs fit tightly into the openings of the cartridge.

(2) That the tube, the cap, and water hole are not stopped up.

(3) That the cotton in the filter is changed frequently.

(4) That the stopcock is closed before inserting the frame in the water. If this latter instruction is not complied with, it can be readily seen that the water will have free access to the carbide and excessive generation will occur.

614. When the charge is exhausted, the entire cartridge is taken out and thrown away. This eliminates the handling of carbide and the disagreeable task of cleaning out the residuum after the gas has been extracted.

Connection is made from the stopcock to the hose connection on the lantern proper, and this is the passageway of the gas from the generator to the burner. As soon as the stopcock is opened the water rises through the tube and flows to the carbide. The advantage of the cartridge being submerged in the water is to reduce and absorb as much of the heat liberated by generation as is possible. These lanterns have been tested up to a distance of 10 miles with the naked eye, and under favorable conditions can be used over a range somewhat in excess of this. With a 30-power telescope the flash can be read at a distance of 30 miles.

615. *Operation and care.*—Take the lamp and generator from the case by aid of the handle attached to the lamp; screw the complete outfit on a heliograph tripod, or stand the outfit on a level object; remove the cover of generator, to which is attached the flexible frame, detach spring from the catch of the flexible frame; tear off flaps from the ends of carbide cartridge (or pry off small caps), and attach the cartridge. Then attach to frame, being careful to see that both rubber plugs fit tightly into the holes in the cartridge; fasten the latch of the spring over the metal catch; close stopcock on service pipe; completely fill the outer can of generator with water, the object being to have the generator level full of water when the lamp is in service, then immerse the frame and cartridge, pressing the top of the generator down tight. In doing this the water will overflow the sides of the generator tank. Now connect by rubber tubing the stopcock with the gas inlet at the bottom of the lamps, then (1) open front door of the lamp, (2) light a match, (3) open stopcock, and (4) light the gas at the burner. In doing this hold the key open. In the new model the key and hose connection are on the side of bottom of lamp.

When the gas is ignited the lamp is ready for signaling, and the key can be operated as is the Morse telegraph instrument, but not so rapidly.

In the event of the flame being too high when the key is closed, adjustment can be made by loosening the set screw and adjusting the light. When at the proper height tighten the set screw, which locks the by-pass in its proper position. In the new model this is accomplished by aid of the regulator by-pass valve at the left-hand side of bottom of lamp. The lamp is properly adjusted when shipped and should not be changed unless absolutely necessary. Connect the rubber tube to the burner before opening the stopcock on the generator.

To recharge the generator take the frame and the old cartridge from the case, throw away the old case and replace with a fresh one, proceeding as before.

See that fresh water is put in the generator each time a new cartridge is used.

In the tube through which the service pipe passes is a felt filter for taking the dust out of the gas. If the filter clogs, unscrew the cap to which the service pipe is attached, clean the felt, or replace it with a new filter, binding it in place by a stout thread or string.

If the burner of the lamp does not produce a perfectly flat flame, it has become clogged and should be cleaned with the burner cleaner furnished, or a new burner should be substituted, care being taken to put a little white lead on the nipple, if practicable, so as to insure a tight joint.

In repacking the outfit in the case, throw out the water and wipe the can and generator parts dry. You can not be too careful to keep the apparatus clean. This is especially true of the small pipe that passes up through the bottom of the cartridge, with a cap over it. The cap should always be screwed in place, as its object is to prevent the water from squirting to the top of the cartridge.

The back of the lamp can be removed by turning the small thumbscrew on the top and drawing out the pin which holds the shell into which is fitted the lens. It is not necessary to take the back out except to replace a lens, as the latter can be cleaned by opening the front door.

If it is desirable to use the lamp as a hand lantern, the flame can be turned on full by turning the button in in a vertical position; this locks the key open. In the new model depress the key and lock it with the latch above the key.

One charge of calcium carbide will supply gas to burn about one hour with the light turned on full, or for approximately three hours signaling.

If signaling is to be suspended for some hours, empty the water out of the generator and close valve.

The glass front can be replaced by taking out the wire spring. The glass cuts should be mounted in a horizontal position and, to prevent breaking, should be protected from rain when the lamp is hot.

If a glass should be broken and an extra one is not available to replace it, signaling can be continued by turning the flame on full and using the heliograph shutter, a cap or piece of board in front of the lantern to obscure and reveal the flash. Without the protection of the cover the flame is easily blown out when turned low, but will not be extinguished even in a strong wind if the gas is turned full on.

616. *Powers and limitation of the acetylene signal lantern.*—As conditions are usually more uniform at night than in the daytime, the signal lantern is probably the most reliable of all visual signaling outfits. The advantages of this form of apparatus are its portability, speed of operation, and comparatively great range. The principal disadvantages are due to the interference caused by rain, fog, and moonlight. The speed attainable with the lantern is about the same as that attainable with the heliograph.

Rockets.

617. Two distinct kinds of rockets are issued, one of which is adapted to day and the other to night signaling. Rockets of the amber-smoke type with parachute are used in the daytime, while sequence rockets are used at night.

Description.—Rockets for both day and night signaling are equipped with parachutes. The smoke rocket is of similar construction to the smoke shell. The sequence rocket is so arranged at the base that threaded sections of combustible material burning either red or white can be attached to it. Rockets ascend about 700 feet.

Each rocket is supplied in a cylindrical sealed tin can, which also contain a port fire, wind matches, and for the rockets a stick in four sections. On the outside of the can is a label designating the kind of rocket therein contained. These cans are easily opened by pulling a ring and require no special opening tool.

The sequence rocket is prepared for use by attaching red or white sections to the base in such a combination as to form letters of the alphabet which it is desired to use.

Letters containing the same color in sequence are very difficult to read and should be avoided whenever possible. If necessary to use them, blank sections furnished for the purpose should be inserted between the units. The base of the rocket will secure six units.

618. When rockets are to be fired the sticks must be firmly attached, the rocket placed upright in a trough, upon a frame, or against a post. If the fuse is beneath the paper covering the "choke" orifice, the paper should be torn off and the rocket lighted by a port fire. In the rocket now used the fuse extends through the covering and can be lighted direct. If the night be damp, this fuse should be exposed only a moment before the rocket is fired. If several rockets are to be fired in succession, it is well to prepare them all at the same time, and to have them all stood upright, but each separated from the other at a distance of at least 6 feet, else one may ignite the other accidentally. In firing for chronosemic signals, one rocket ought to be kept ready upon the frame and in reserve, to be fired in place of one that fails.

If a rocket misses fire, it is to be taken from the stand and laid on the ground. Its place is at once supplied by a similar rocket, fired in its stead. The failing rocket is laid on the ground, pointed away from the station, in order that if it has only hung and should afterwards ignite it may not disarrange the signal shown or injure anyone of the party. If the wind blows freshly, the rocket to be fired should be inclined slightly against the wind.

Signal rockets are furnished in sealed cans and should not be removed therefrom until ready for use. Strict economy should be observed in the use of these articles, and on no account should they be used for purpose of display.

619. ***Employment.***—Rockets are especially valuable in making preconcerted or emergency signals. On account of the great amount of ammunition required it is impracticable to spell out messages with them. These articles should be supplied to outposts, detached stations, etc., to be used for signaling the approach of the enemy, or the happening of unexpected events, which should be known promptly.

Very's Night Signals.

620. The Very system employs projected red, white, and green stars, which are shot from pistols held in the hand.

Description.—The Very pistol is a breech-loading, single-shot pistol, with an 8-inch steel barrel chambered to receive a 12-gauge commercial shotgun shell. Brass shells are used and are packed in boxes colored to indicate the character of stars employed in loading. The color of the star fired may indicate an element of any alphabet or any special signal which may be desired. The stars rise to a height of about 200 feet and remain visible for some time.

For more complete descriptions of apparatus for visual signaling, management of stations, and instructions for operators reference is made to Manual No. 6, Signal Corps.

CHAPTER IV.—FIELD LINES.

General Provisions.

621. From instruction with the buzzer the work will be carried on in actually laying field lines on the drill ground or along such roads as are available. The units for this work will be the section, platoon, and company. Whether operating alone or in combined training each section lays, operates, and maintains its own line.

622. Two kinds of wire are provided for this work: The 11-strand field wire, which will be used when possible, and the 3-strand buzzer wire, which will be used only as hereinbefore prescribed.

THE WIRE CART.

623. The means provided for laying field lines is a wire cart, with drums and an automatic gear for picking up the wire when driving back over the line. This is supplemented by carriers for buzzer wire to be used by men on foot or mounted.

624. Immediately after each drill, maneuver, or other formation, the wire cart will be thoroughly inspected by the chief of section. Notes will be made of necessary repairs, and turned in by him to the company commander. An inspection will be made prior to each formation by the chief of section, to see that all the bearings of the cart are clean and oiled, except the clutch, which will be bright and free from oil. He will see that the axles are greased and the harness in repair; that oil cans are full, and that there is no sediment in the holes to prevent the oil from reaching the bearings.

TO CLEAN THE WIRE CART.

625. Always after the cart has been used, after each formation, before the cart is parked, the drivers and cart operators will thoroughly clean the chains, friction clutch, and sprocket wheels with a stiff brush and rough cloth, removing all dust, dirt, and hard oil. After cleaning, these parts will be gone over with a well-oiled cloth to prevent rust.

626. Once each week, or when directed by the company commander, the section will be assembled, and, under the supervision of the chief of section, the cart given a thorough washing and cleaning throughout. All dirt and dust will be removed from the woodwork with a broom or stiff brush, and dust and oil from the metal parts with a cloth. Hose will be then used to wash the cart, if available; otherwise pails and sponges will be used. The metal parts will be wiped dry before oiling.

Occasionally the friction clutch will be taken apart under the supervision of the chief of section and cleaned with gasoline. A light oil will be sparingly used before assembling to prevent rust.

In the field paulins will be placed over the carts after use, and not removed until the cart is again used. These paulins will be folded and placed on the chest when the cart is in action.

MANIPULATION OF THE WIRE CART.

627. The manipulation of the machinery of the cart for handling wire will be a part of the duty of the cart driver, unless an operator be placed on the cart, in which case the latter will do this. He will stop the cart at command or signal from the chief of section.

The reel will always be stopped before a march to the rear is taken up.

In spooling up wire the reel should be stopped when the loop gets too short and the clutch should be thrown in before the loop gets too long.

LAYING THE LINES.

628. Slack will be pulled back and the wire tied in every 500 or 600 yards or when the section chief directs. The line will always be tied at turns, in such manner as to prevent the wire from crossing the roads. Under no circumstances will the wire be so tied as to subtend the arc formed by any turn in the road. Should a number of turns come together, the cart will be halted until the work is satisfactorily performed. Ties will be made by two round turns and a half hitch, around bushes, trees, or anything fixed in the ground, and as close to the ground as possible.

At points where the line crosses roads or at crossroads the line will be raised overhead or buried, unless the road is little traveled, when it may be tied on each side with plenty of slack. When there is nothing to tie to, stones will be placed on the wire on either side of the road.

Generally the wire will be laid to one side of the roadbed to avoid unnecessary damage to the wire from wheels, etc., but in unfenced country, where mounted men and stock may approach the road from the adjacent fields, it will frequently be advisable to lay it in the road, so that it will be flat and also be more easily seen.

Plenty of slack wire always will be taken, so that it will drop off the feet of animals passing over it, without breaking the wire or throwing the animal.

In crossing railroads or trolley lines, the wire is cut and the ends run under the rails. To prevent delay, a man of the section will be dropped off at such crossings and connect the wire, then overtake the section at an increased gait.

In passing through villages, the wire will be placed overhead on telegraph and telephone poles. The climbers carried with the cart will be used for this purpose. A man will be dropped for this work; when completed, he overtakes the section. Men left behind in laying the wire, for any duty, will follow the line in overtaking the section, looking for breaks.

The gait to be taken in laying lines will depend on the kind of troops the section is following and the speed made by them. In all cases the line will keep in touch with the element it is to transmit information for. When the last station is cut in, horses may be unhitched if the troops seem likely to remain in place any length of time.

On the care with which lines are laid will depend in no small degree their efficiency. Carelessly laid lines will need much attention to repair breaks, and will cause many delays in messages, and no end of annoyance to other troops.

Speed will always be sacrificed to carefulness in this work. Wire fences, telephone and telegraph lines may sometimes be used to advantage.

OPERATING THE LINES.

Stations and Call Letters.

629. Each section will be assigned call letters for four stations, which in general should not exceed four. The first section will be given the letters A, B, C, and D; the second section the letters F, G, H, and K; the third section, M, N, Q, and R; the fourth section, S, U, W, and X. The stations are assigned the call letters in order of establishment, not location, beginning with the first letter. The call of headquarters is SO, which will be its call whenever it may be on the line, suspending for the time being the letter of the station where it may be. This applies to the first station established as well as to the later ones.

Branch lines electrically connected with the main line have offices given calls as if on the main line.

An office on a branch line not connected with the main line will be assigned the call letter of the station where the branch goes out, adding J to it.

630. As soon as a station is established the operator will call up the initial station and report. The opening of all stations, including the initial station, will be reported to the officer or noncommissioned officer in charge of the line, and by the latter to the company commander and to the commanding officer for whose use the line was established.

Each operator will have his personal sign, as Smith "SM," Johnson "JO," etc.

631. To open station with buzzer the operator will attach the buzzer connector to the line wire and ground rod. Care will be taken that the teeth of the connector have penetrated the insulation of the line wire. Damp ground will be sought for the ground rod; if not available the ground will be dampened around it with water from the canteen.

The operators will not leave their buzzers unless properly relieved by higher authority.

At night, when lanterns are necessary at a station, the light must be so placed as to conceal it from hostile observation.

When it becomes necessary to move a station some distance from the line and it is not practicable to use field wire for extending the line, the buzzer wire carried by the lineman may be used.

The buzzer carried by the lineman may be used for opening stations on branch lines.

632. Stations will be conducted in a military manner. Silence will be preserved, except conversation relative to business. The lines will not be used for conversational purposes between operators.

Buzzers will be kept dry. In case of wet weather the shelter tents of messenger and operator will be made into an office.

No unauthorized persons will be allowed around stations.

MAINTAINING THE LINES.

633. Each lineman will be equipped with a carrier with one-fourth mile buzzer wire and a buzzer for testing the line. This will enable linemen to determine in what part of the line a break may be. Intermediate stations will assist in this, and when the section in which the break exists has been located the messenger or any available man will be sent to find and repair it if no lineman is at hand. In following the line to locate breaks the lineman will take up the gallop, following the line with his eye where it is raised from the ground, and with the pike where it is on the ground. He picks it up with the hook. In order to prevent a knot or splice from being caught in the hook and jerking the pole from his hand he raises the pike in a horizontal position, slips the wire out of the hook and on to the handle, and allows the wire to run on it near the hook, the shoulder of the hook keeping it from slipping off. By lowering the pike and turning it around in the hand the wire slips quickly to the ground.

634. To repair a break the ends will be first scraped, the scraped ends tied in a square knot, the loose ends twisted around the line wire, and all carefully insulated with tape. The knots should be pulled tight and made as small as possible, so that in reeling up the knots will not jerk the pike and glove from the hand.

635. Lines which have been hastily laid will be patrolled at once, the linemen proceeding from each end until they meet, reporting from there by wire to their sections for instructions. In thus patrolling lines it will be with a view to placing the wire flat on the ground, should it have become taut after the section passed, and otherwise arranging it to lessen the likelihood of breaks. Should a line cross a macadamized road, heavily traveled by artillery and cavalry, with no means to place it overhead, a lineman will be left at the point to repair any possible break. Should travel over the road practically cease, he will ask for instructions by wire.

Frequent patrols will be made over lines which pass over fields of grain, weeds, or underbrush in unfenced country, and can neither be placed flat on the ground nor overhead. Breaks are more apt to occur with lines thus laid.

On all occasions in handling wire, such as reeling it on to the reels in filling them or reeling it off for repairs, the section chief will have leaks in insulation repaired and all connections looked over. This aids materially in the working of the lines when the wire is laid.

RECOVERING THE WIRE.

636. Wire will not be picked up at a faster gait than a trot. Should a more rapid gait become necessary to escape capture, the wire will be cut and abandoned. The real object is to lay wire and not to pick it up. Should wire have to be abandoned, the cart will refill its reel at the earliest possible moment from the reserve. Wire will only be temporarily abandoned at maneuvers. The section will return for it when the maneuver is completed. Under no circumstances will wire be reeled up on the reels or spools until any breaks in the metallic continuity of the wire have been repaired.

PART VI.

SIGNAL TROOPS IN THE FIELD.

POSITION.

637. The position of signal troops will be governed by the tactical requirements of the situation. Detachments of signal troops must necessarily, whether on the march, in camp, or in combat, be near the commanding officer of the troops with whom communication must be maintained.

To this end commanding officers of signal troops will make such distribution of their command as will enable signal troops to best secure this result without interfering with the function of other troops.

638. The position of the signal officer is usually with the commanding general or with the commanding officer of the unit for which he is furnishing lines. From this point he can get a grasp of the situation and be able to direct the operations of his platoons and sections to the best advantage. All contemplated changes in the location of wire carts and stations will be reported to him.

MARCHES.

639. The average march for field signal troops, on ordinarily good roads, is from 15 to 25 miles per day. With rare exceptions the walk is invariably the gait. Necessity may require alternating the trot and walk, or an unbroken trot, for several miles.

Long marches or expeditions will be begun moderately; 12 to 15 miles per day is enough for the first marches. This may be increased when the horses are inured to their work.

A halt of from 5 to 10 minutes is made at the end of every hour, for the purpose of adjusting saddles and harness, etc. When troops march for the greater part of the day, a halt of about an hour is made near the middle of the day. At this halt cinchas will be loosened and horses unhitched.

Chiefs of platoons and of sections, without waiting for express instruction, will give such orders as may be necessary for helping horses or wagons out of difficulty. All men of the section will be dismounted and used for this purpose if necessary. The noncommissioned officer in charge will take similar action in his train if circumstances make it necessary.

An officer or noncommissioned officer may be sent forward to select a camp ground and arrange for wood and water.

Upon arrival of the company in camp, damages must be repaired without delay; wagons repaired and greased; and horses shod and cared for.

640. When an accident happens to a wagon it is pulled out of the column, if possible, so as not to interrupt the march; otherwise, sections in rear pass it by on the most convenient flank, so as not to delay the march. It will resume its place in the column when the damage is repaired, as soon as it is possible to pass the intervening sections. If a section wire cart or wagon is damaged, the chief of section, with the necessary number of men, will remain with it until repaired unless the damage is beyond repair.

641. More extended instructions for the conduct of marches will be found in the Field Service Regulations.

CAMPING.

642. Camping, while on the march, will be in line, column of platoons, or sections, according to the nature of the available camping space. The company is formed as desired, with proper intervals or distances, and the platoons or sections, as the case may be, turned over to the chiefs of the units into which the camp is established. The men dismount at the command of their chief; unsaddle and place the saddles in a line; hold their horses until the picket line is up, when they tie on the line, reform, and pitch tents. (See par. 649.)

643. The wagons will be parked with about 15 yards interval, on the most convenient flank. The wagons of the train may be parked in a similar manner 15 yards in rear of them. The section picket lines will be carried on the carts. While the men individually mounted are unsaddling the other men attach the picket lines. The horses of each section are tied in the space between the carts, commencing with the first section. This work is supervised by the company commander.

644. The harness is placed on the footboards and covered with the paulins used for protecting carts and instruments.

Saddles are placed alongside the tongues under the paulins, and this equipment protected from the weather by the cart paulins.

645. Should it become necessary to camp in the road, the shelter tents can be placed to one side in line and the picket line extended from one flank, as indicated above. The officers' tents will be placed in the locality most available and the kitchen in the most convenient place for the men. Tents will be faced according to prevailing weather. Men not assigned to sections will pitch tents with the train.

646. On arriving in camp, sinks will be dug at once. If the march is to be resumed the following day, some sanitary arrangement may be made; ordinarily sinks with brush screens will be necessary.

647. Camp will be broken in the following order: Immediately after *reveille* the men will feed their horses and, if time permits, groom for 20 minutes, each man caring for his own horse.

Tents will be struck and rolls made, which is followed by breakfast, then *water call,* followed by *boots and saddles.* The picket lines are placed upon the carts and the company formed in column of sections or as directed by the captain.

648. In maintaining extended lines, the men will camp in pairs, squads, or sections, as the nature of the duty dictates.

For camps of any duration, or permanent camps, instructions contained in Field Service Regulations will be followed.

PITCHING TENTS.

Single Shelter Tents.

649. The captain causes the company to *form for shelter tents.*

The officers fall out, the first sergeant falls in as rear-rank man of the right file, composed of himself and guidon; blank files are filled by the file closers or by men taken from the front rank.

The captain then commands: 1. *To the left (right) take shelter tent intervals;* 2. *MARCH;* 3. *COMPANY;* 4. *HALT;* 5. *FRONT;* 6. *PITCH TENTS.*

At the command *march,* all face to the left and move off in succession, the front and rear rank men alternating. Each rear-rank man places himself in rear of his front-rank man in a single column; as the line is being extended each man grasps with his left hand the right wrist of the man in front.

If intervals are taken to the right, the front-rank man of each file follows his rear-rank man, and each man grasps with his right hand the left wrist of the man in front.

At the command *halt,* given as the second man from the right has his interval, all halt, face to the front, dress to the right, and correct their intervals by moving to the left until the arms are fully extended.

At the command *front,* all drop their hands.

At the command *pitch tents,* each rear-rank man moves back to four paces in rear of his front-rank man; all unsling and open the blanket rolls and take out the shelter half, poles, and pins; the front-rank man places one pin in the ground at the point where his right heel, kept in position until this time, was planted. Each then spreads his shelter half, triangle to the rear, flat upon the ground the tent is to occupy, rear-rank man's half on the right. The halves are then buttoned together. Each front-rank man joins his pole, inserts the top in the eyes of the halves, and holds the pole upright beside the pin placed in the ground; his rear-rank man, using the pins in front, pins down the front corners of the tent on the line of pins, stretching the canvas taut; he then inserts a pin in the eye of the rope and drives the pin at such distance in front of the pole as to hold the rope taut. Both then go to the rear of the tent; the rear-rank man adjusts the pole and the front-rank man drives the pins. The rest of the pins are then driven by both men, the rear-rank man working on the right.

As soon as the tent is pitched each man arranges the contents of the blanket roll in the tent and stands at attention in front of his own half on line with the front guy-rope pin.

The guy ropes, to have a uniform slope when the shelter tents are pitched, should all be of the same length.

650. Shelter tents are pitched by a squad, section, or platoon in the same manner as by a company.

Double Shelter Tents.

651. The double shelter tent is formed by buttoning together the square ends of two single tents. Two complete tents, except one pole, are used. Two guy ropes are used at each end, the guy pins being placed in front of the corner pins.

The double shelter tents are pitched by Nos. 1 and 2 front and rear rank, and by Nos. 3 and 4 front and rear rank; the men falling in on the left are numbered, counting off if necessary.

The captain gives the same commands as before, inserting *double* before *shelter* in the first command, and before *tents* in the last command.

The commands are executed in the same manner as when pitching single shelter tents, with the following exceptions:

Only the front-rank men grasp wrists; the rear-rank men cover their file leaders at 6 paces.

The first sergeant places himself on the right of the guidon and with him pitches a single shelter tent.

Only the odd numbers of the front rank mark the line with the tent pin.

All the men spread their shelter halves on the ground the tent is to occupy. Those of the front rank are placed with the triangular ends to the front. All four halves are then buttoned together, first the ridges and then the square ends. The front corners of the tent are pinned by the front-rank men, the odd number holding the poles, the even number driving the pins. The rear-rank men similarly pin the rear corners.

While the odd numbers steady the poles, each even number of the front rank takes his pole and enters the tent where, assisted by the even number of the rear rank, he adjusts the pole to the center eyes of the shelter halves in the following order: First, the lower half of the front tent; second, the lower half of the rear tent; third, the upper half of the front tent; fourth, the upper half of the rear tent. The guy ropes are then adjusted.

The tents having been pitched, the triangular ends are turned back, contents of the rolls arranged, and the men stand at *attention*, each opposite his own shelter half and facing out from the tent.

652. To pitch single or double shelter tents by battalion, the major causes the right (left) guides to cover, dresses the battalion on the covering guides, and commands: 1. ***Pitch (double) tents.*** Each captain causes his company to pitch tents by the same commands and in the same manner as previously described.

TO STRIKE SHELTER TENTS.

653. Everything having been removed from the tents: 1. ***Strike tents,*** 2. ***DOWN,*** 3. ***To the right (left) assemble,*** 4. ***MARCH.***

At the first command the side pins are removed; the front rank men steady the front pole, the rear rank men the rear pole, and all remaining pins are removed.

At the second command, or last note of ***the general,*** the tents are lowered, blanket rolls packed and slung, and the men stand at attention in front and rear of the places lately occupied by their tents at their original places after extension.

At the fourth command they close in to the right and re-form company.

COMMON AND WALL TENTS.

654. Four men, numbered from 1 to 4, consecutively, pitch each tent.

Nos. 1 and 2 place the ridgepole perpendicular to the company street, with one end against the position pin; Nos. 3 and 4 drive a pin at the other end of the ridgepole. Nos. 1 and 2 mark the positions of the four corner guy-rope pins by placing the ridgepole parallel to the company street, to the right (facing the tent) of the position pin; Nos. 3 and 4 drive a large pin one pace in front of the outer end of the ridgepole. The other three corner guy pins are set in succession in the same manner, going first straight to the rear, then across the tent, and then to the front. All four then spread the tent on the ground it is to occupy: Nos. 1 at the front and 2 at the rear insert the uprights. The ridgepole and uprights are joined, the pole pins inserted in the eyelets of the tent and fly, and the tent raised to a vertical position with the poles at the pins. Nos. 1 and 2 hold the tent in position; No. 3 places the front guy ropes of tent and fly, No. 4, the rear, on their pins, and tighten the same so as to hold the poles vertical. The wall pins are then driven through the loops, walls hanging vertically. The other pins are then driven on line with the corner pins and in prolongation of the seams of the tent.

CONICAL WALL TENTS.

655. The conical wall tent is pitched by eight men. The ranking noncommissioned officer numbers the men from 1 to 7 and superintends the work. Upon the hood lines of the tent are placed three marks; the first about 8 feet 3 inches, the second about 11 feet 3 inches, the third about 14 feet 2 inches from the hood ring; the first marks the distance from the center to the wall pins, the second to the guy pins, and the distance between the second and third is the distance between guy pins. These distances vary slightly for different tents and should be verified by actual experiment before permanently marking the ropes. They should also be frequently verified on account of the stretching of the rope. To locate the position of guy pins after the first, the hood being held on the center pin, with the left hand hold the outer mark on the pin last set, with the right hand grasp the rope at the center mark and move the hand to the right so as to have both sections of the rope taut; the center mark is then over the position desired; the inner mark is over the position of the corresponding wall pin.

To pitch the tent, No. 1 places the tent pole on the ground, socket end against the door pin, pole perpendicular to the company street. No. 2 drives the center pin at the other extremity of the pole. No. 3 drives a wall pin on each side of and 1 foot from the door pin. No. 4 places the open tripod flat on the ground with its center near the center pin. The whole party then places the tent, fully opened, on the ground it is to occupy, the center at the center pin, the door at the door pin.

The noncommissioned officer in charge holds the hood ring on the center pin, and superintends from that position. No. 1 stretches the hood rope over the right (facing the tent) wall pin and No. 2 drives the first guy pin at the middle mark. No. 1 marks the position of the guy pins in succession and No. 2 drives a pin lightly in each position as soon as marked. At the same time No. 5 inserts small pins in succession through the wall loops and places the pins in position against the inner mark on the hood rope, where they are partly driven by No. 6. No. 4 distributes large pins ahead of Nos. 1 and 2; No. 7, small pins ahead of Nos. 5 and 6; No. 3 fellows Nos. 1 and 2 and drives the guy pins home. No. 7, after distributing his pins, takes an ax and drives home the pins behind Nos. 5 and 6. No. 4, after distributing his pins, follows No. 3 and loops the guy ropes over the pins.

Nos. 1, 2, and 3, the pins being driven, slip under the tent and place the pin of the pole through the tent and hood rings while the noncommissioned officer in charge places the hood in position. Nos. 1, 2, and 3 then raise the pole to a vertical position and insert the end in the socket of the tripod. They then raise the tripod to its proper height, keeping the center of the tripod over the center pin. While they hold the pole vertical Nos. 4, 5, 6, and 7 adjust four guy ropes, one in each quadrant of the tent, to hold the pole in its vertical position, and then the remaining guy ropes. As soon as these are adjusted the men inside drive a pin at each foot of the tripod, if necessary, to hold it in place.

TO STRIKE COMMON, WALL, AND CONICAL WALL TENTS.

656. 1. *Strike tents,* 2. ***DOWN.***

The men first remove all pins except those of the four corner guy ropes—four quadrant guy ropes in case of the conical wall tent. The pins are neatly piled or placed in their receptacle.

One man removes each guy from its pin, and all hold the tent in a vertical position until the command ***down,*** or the last note of ***the general,*** and then lower it to the indicated side.

The canvas is then folded, or rolled, and tied, the poles, or tripod and pole fastened together and the remaining pins collected.

TO FOLD TENTS.

657. ***Wall tents.***—Spread the tent flat on its side and place all guys but two over on the canvas; fold the triangular ends over so as to make the canvas rectangular; fold both ends so that they meet at the center, and then fold one end over on the other; fold the bottom and ridge over so that they meet at the center of the strip, and then fold one end over on the other.

Fold the fly into four folds, parallel to its length, then in a similar manner across its length, making a rectangle with dimensions about the same as the folded tent.

Place the fly on the tent, cross the two free guys, and tie them so that they pass over the ends and across the sides.

The hospital and command tent are folded in the same manner as the wall tent.

Conical wall tents.—Spread the tent flat, with the door up; holding the ring vertical, fold the two edges in so they meet at the center, and again fold in the same manner; place the hood on one half and fold the other half over on it; turn wall over toward ring, fold coming at about middle of height of wall; two men working together then roll from the ring down, placing knees on each fold to make bundle compact and flat.

Tie the bundle with the two free guys, as in case of the wall tent.

GENERAL REMARKS.

658. As soon as the lines of company streets are established the positions of the tents should be marked, from the flank nearest the officers' tents, by pins. The front pole of the wall and common tent and the door pins of the conical wall tents occupy the points so marked. The distance between pins may be determined by pacing or by a light cord with the distances marked upon it. These distances are: For wall tents, 8 paces; common tents, 6 paces; conical wall tents, 10 paces. The pins marking the position of the tents are, when practicable, set on a straight line, and the company officers verify and correct the alignment of such pins in the quickest and most convenient manner.

659. Wall pins are so driven as to slope slightly away from the tent; guy pins so as to slope slightly toward the tent.

660. Each tent, its fly, hood, poles, and tripod, should have the same number.

661. The conical wall tent complete consists of 1 tent and hood, 76 pounds; 1 tent pole and tripod, 32 pounds; 48 pins, about 20 pounds; total weight, 128 pounds. Its dimensions are: Diameter, 16½ feet; height, 10 feet; height of wall, 3 feet; packed, contains 13 cubic feet.

662. The wall tent complete consists of 1 tent, 43 pounds; 1 fly, 15 pounds; 1 set poles, 25 pounds; 10 large and 18 small tent pins, about 15 pounds; total weight, 98 pounds. Its dimensions are: Length of ridge, 9 feet; width, 8 feet 11 inches; height, 8½ feet; height of wall, 3 feet 9 inches; packed, contains 6 cubic feet.

663. The common tent complete consists of 1 tent, 26 pounds; 1 set poles, 15 pounds; 24 small tent pins, weight about 9 pounds; total weight, 50 pounds. Its dimensions are: Length of ridge, 6 feet 11 inches; width, 8 feet 4 inches; height, 6 feet 10 inches; height of wall, 2 feet.

664. The shelter-tent equipment of each enlisted man consists of the following:

(*a*) One shelter half, weight 3 pounds.
(*b*) One pole in 3 joints, 47 inches long; weight, 10½ ounces.
(*c*) Five tent pins, 9 inches long; weight, 10 ounces.

The shelter tent is pitched by two men, whose combined equipment make a complete tent. The tent, when pitched, occupies a space 5 feet 4 inches deep and 6 feet 4 inches wide; the two triangular parts, when pinned to the ground, inclose an additional triangular space 20 inches deep.

665. In striking tents, common and wall tents are, unless otherwise directed, lowered to the right facing out from the tent door; conical wall tents away from the door.

PART VII.

CEREMONIES.

CHAPTER I.—GENERAL RULES.

666. On occasions of ceremony, except funerals and reviews of large forces, troops will be arranged from right to left in line and from head to rear in column in the following order: First, Infantry; second, Field Artillery; third, Field Signal troops; fourth, Cavalry.

Artillery, Engineer, and Signal Corps troops, equipped as Infantry, are posted as Infantry; dismounted Cavalry and Marines attached to the Army are on the left of the Infantry in the order named; companies or detachments of the Hospital Corps and mounted detachments of engineers are assigned to places according to the nature of the ceremony. When Cavalry and Field Artillery are reviewed together without other troops the Artillery is posted on the left; if, however, Field Signal troops are present, they are posted between the Cavalry and Field Artillery. Troops in column in funeral escorts will be arranged from head to rear in the following order: First, Cavalry; second, Field Signal troops; third, Field Artillery; fourth, Infantry. In the same arm, Regulars, Militia in the service of the United States, and Volunteers are posted in line from right to left or in column from head to rear in the order named. In reviews of large bodies of troops the different arms and classes are posted at the discretion of the commanding general, due regard being paid to their position in camp. On all other occasions troops of all classes are posted at the discretion of the general or senior commander.

667. At formations for ceremony sabers are drawn. Mounted officers in facing toward the line and in resuming their front always execute a left about.

Staff and noncommissioned staff officers, when it is not otherwise prescribed, draw and return saber with their chief.

668. A noncommissioned officer in command of a company takes post on the right of the company in line with it. After aligning it he takes the post of the captain when the battalion is in column.

Companies of the battalion are formed and posted as prescribed in paragraph 329.

CHAPTER II.—REVIEWS.

GENERAL RULES.

669. The adjutant or the adjutant general posts men or otherwise marks the points where the column changes direction, in such manner that the right flank in passing the reviewing officer shall be about 10 yards from him.

670. The post of the reviewing officer, usually opposite the center of the line, is marked by a flag.

671. The reviewing officer, his staff, and others at the reviewing stand salute the standard as it passes, whether the standard salutes or not; those with arms not drawn salute by uncovering. The reviewing officer returns the salute of the commanding officer of the troops, and of such commanding officer only.

672. The staff of the reviewing officer is in single rank, 6 yards in rear of him, in the following order from right to left: Chief of Staff, officers of the General Staff Corps, adjutant general, aids, then the other members of the staff in the order of rank, the senior on the right; the flag and orderlies place themselves 3 yards in rear of the staff, the flag on the right.

673. Officers of the same or higher grade and distinguished personages invited to accompany the reviewing officer place themselves on his left; their staff and orderlies place themselves, respectively, on the left of the staff and orderlies of the reviewing officer; all others who accompany the reviewing officer place themselves on the left of his staff, their orderlies in rear. A staff officer is designated to escort distinguished personages and to indicate to them their proper positions.

674. When riding around the troops, the reviewing officer may direct that his staff, flag, and orderlies remain at the post of the reviewing officer or that only his personal staff and flag shall accompany him; in either of these cases the commanding officer alone accompanies the reviewing officer. If the reviewing officer is accompanied by his staff, the staff officers of the commander place themselves on the right of the staff of the reviewing officer.

While passing in review or riding around troops the staff is formed in one or more ranks, according to its size.

675. The staff, flag, and orderlies of brigade commanders place themselves in the order prescribed for the staff, flag, and orderlies of the reviewing officer.

676. When the reviewing officer is not in front or in rear of a regiment, or other separate organization, its commander may cause it to stand *at ease, to rest,* or *to dismount* and *rest,* and to resume *attention* and *mount,* but so as not to interfere with the ceremony.

677. When the commanding officer of the troops turns out of the column his post is on the right of the reviewing officer; his staff, in single rank, on the right of the staff already there; his flag and orderlies in rear of his staff

When the column has passed, the commanding officer, without changing position, salutes the reviewing officer and then with his staff and orderlies rejoins his command.

If the person reviewing the command is not mounted, the commanding officer and his staff, on turning out of the column after passing the reviewing officer, dismount preparatory to taking post on the right of the reviewing officer and his staff. In such case the salute of a commanding officer, prior to rejoining his command, is made with the hand before remounting.

678. When the general, the colonel, or the major faces the line to give commands, the staff and orderlies do not change position.

679. Each guidon and, when the rank of the reviewing officer entitles him to the honor, each standard salutes at the command, *present saber;* and again in passing in review when 6 yards from the reviewing officer. The standard and guidons are raised at the command, *carry saber,* or when they have passed 6 yards beyond the reviewing officer.

680. The band of each battalion, corps, or regiment plays while the reviewing officer is passing in front of and in rear of the organization.

During the march in review each band, immediately after passing the reviewing officer, turns out of the column, takes post in front of and facing him, and continues to play until its organization has passed, then ceases playing and follows in rear of its organization; the band of the following organization commences to play as soon as the preceding band has ceased. The trumpeters of each organization, except those pertaining to the organization commanders, are consolidated in rear of the band.

If the band be not present, the trumpeters of each organization, with the exceptions above noted, are consolidated and posted in single rank in a position corresponding to that of the band. They conform to what is prescribed for the band, the chief trumpeter taking post and performing the duties of the drum major.

This rule applies to all ceremonies.

681. If the rank of the reviewing officer entitles him to the honor, the march or flourishes are sounded by the trumpeters when sabers are presented, and sounded again in passing in review at the moment the standard salutes, by the trumpeters halted in front of the reviewing officer.

Trumpeters with the organization commanders do not sound the march or flourishes.

682. The formation for review may be modified to suit the ground, and the present saber and the ride around the line by the reviewing officer may be dispensed with.

683. If the post of the reviewing officer is on the left of the column the troops march in review with the guide left; the commanding officer and his staff turn out of the column to the left, taking post as prescribed above, but to the left of the reviewing officer.

684. Field companies of the Signal Corps pass in review at a walk, trot, or gallop. When passing at the trot or gallop no salutes are made except by the commander of the troops when he leaves the reviewing officer.

685. When the command is to pass at an increased gait the band (or trumpeters, if no band is present) remains in front of the reviewing officer and continues to play until the column has completed its second change of direction after passing the reviewing officer. As soon as the increased gait is taken up by the column the band plays in appropriate time, ceasing when the column has again completed the second change of direction after passing the reviewing officer. Upon the completion of the review, the band returns to the position it occupied before marching in review or is dismissed, as may be directed. If there be more than one band, the band last in the column remains in front of the reviewing officer; the others turn out of the column when the increased gait is taken up by their respective organizations, and rejoin them, or are dismissed on the termination of the review.

686. In reviews of brigades or larger commands each battalion, after its rear has passed the reviewing officer 50 yards, takes an increased gait for 100 yards in order not to interfere with the march of the column in rear.

The troops, having passed the reviewing officer, return to their camps by the most practicable route, being careful not to delay the march of the troops in rear of them.

687. When field companies of the Signal Corps are reviewed in line with Cavalry, Infantry, or Field Artillery, they are formed with the mounted men aligned on the front rank of the Infantry or on the rank of Cavalry, or on the lead drivers of the Artillery.

At the command *close ranks, march,* with infantry, or *attention, posts,* with cavalry or field artillery, the Signal Corps commander commands: 1. *Attention;* 2. *POSTS.* The chiefs of platoon and standard bearer resume their posts in line.

The instrument, kit, and field wagons do not accompany the companies at the review unless so ordered.

688. When it is necessary that an organization should be reviewed before an inspector junior in rank to the commanding officer, the commanding officer receives the review and is accompanied by the inspector, who takes post on his left.

BATTALION REVIEW.

689. The battalion being in line, the major faces to the front; the reviewing officer takes his post; the major turns about and commands: 1. *Prepare for review;* 2. *MARCH.* The staff remains in position, facing to the front.

At the command *march,* the chiefs of platoons, and the standard bearers, if present with the standards, move up on the line of captains. Noncommissioned officers acting as chiefs of platoon do not move up on the line of captains.

The major then faces to the front.

The reviewing officer moves a few yards toward the major and halts; the major turns about, commands: 1. *Present;* 2. *SABER,* and again turns about and salutes.

The reviewing officer returns the salute, the major turns about, brings the battalion to carry saber, and again turns to the front.

The reviewing officer approaches to within about 6 yards of the major, the latter salutes, returns saber, joins the reviewing officer, takes post on his right, and accompanies him around the battalion. The reviewing officer proceeds to the right of the band, passes along the front of the officers to the left of the line, and returns to the right, passing in rear of the line. The reviewing officer and those accompanying him salute the standard when passing in front of it.

While the reviewing officer is riding around the battalion the band plays, ceasing when he leaves the right to return to his post.

On arriving again at the right of the line the major salutes, halts, and, when the reviewing officer and staff have passed, moves directly to his post in front of the battalion, faces it, draws saber, and commands: 1. *Attention;* 2. ***POSTS.*** The chiefs of platoon and standard bearers execute a left about and take their posts in line. The major commands: 1. *By the right flank;* 2. ***MARCH;*** 3. ***BATTALION;*** 4. ***HALT.*** The command *halt* is given as soon as the sections have completed the turn. The band takes post 36 yards in front of the leading company.

The column being formed, the major commands: 1. *Pass in review;* 2. *Forward;* 3. ***MARCH.*** At the command *march* the column marches off, the band playing. Without command from the major the column changes direction at the points indicated, and column of companies or platoons at full distance with guide to the right is formed successively to the left at the second change of direction. The major takes his post 24 yards in front of the band, immediately after the second change. The band having passed the reviewing officer, turns to the left out of the column, takes post in front of and facing the reviewing officer, and remains there until the review terminates.

When the major is 6 yards from the reviewing officer he and his staff salute, turning the head and eyes sharply to the right. When the major has passed 6 yards beyond the reviewing officer he and his staff resume the carry, turning the head and eyes to the front.

The other officers, noncommissioned staff officers and the drum major, salute at the point prescribed for the major, turning the head and eyes as above described. Noncommissioned officers commanding platoons salute with the hand.

The reviewing officer returns the salutes of the major and of the standard only.

The major, having saluted, takes post on the right of the reviewing officer, remains there until the rear of the battalion has passed, then salutes and rejoins his battalion. The band ceases to play when the column has completed its second change of direction after passing the reviewing officer.

If the battalion is to pass around again at an increased gait, in order to keep the original first section at the head of the column each company should execute right by sections just before executing the first change of direction after passing the reviewing officer.

When the battalion arrives at its original position in column the major commands: 1, *Trot* (or *Gallop*); 2. ***MARCH.***

The battalion passes in review as before, except that no salutes are rendered except by the major when he leaves the reviewing officer.

The review terminates when the rear company has passed the reviewing officer; the band then ceases to play and rejoins the battalion or is dismissed. The major and his staff rejoin the battalion.

The reviewing officer may prescribe how often the column shall pass in review and the gait or gaits to be used.

REVIEW OF A BATTALION WITH CLOSED INTERVALS.

690. The battalion is formed in line, each company being at closed intervals. The review is conducted according to the principles previously explained, except that instead of first executing by the right flank the battalion is formed in column of companies with closed intervals but full distances, and passes in review in that formation.

691. When space is limited the battalion may be formed in line with each company in platoon column. The review will be conducted on the general principles previously explained, the battalion passing in review either in platoon column or in column of companies at full distance, as before.

GARRISON REVIEW.

692. A review of a body of troops less than a division, composed of different arms, is conducted on the principles laid down for a battalion.

The senior officer present commands the review; the senior officer present with each arm commands that arm. The troops of each arm form on the line according to the principles prescribed in the drill regulations for that arm.

Each commander gives the commands necessary to carry out the orders of the officer commanding the review.

Mounted troops will not be put in march to pass in review until the rear element of the foot troops has completed the second change of direction. The commanding officer, having saluted, turns out and joins the reviewing officer. The other commanders do not turn out of the column.

CHAPTER III.—INSPECTIONS.

GENERAL RULES.

693. The inspector prescribes the kind of inspection which he desires.

694. If there be both inspection and review, the inspection may either precede or follow the review. When an inspection follows a review with the other arms, the Signal Corps proceeds, at the proper time, to the place designated by the inspector and is inspected separately.

695. Officers draw and return saber with the captain.

COMPANY INSPECTION MOUNTED.

696. The company being in line at normal intervals, the captain forms the mounted men of the sections in line in front of the carts and pack mules by the commands.

1. *Sections;* 2. *Left front into line;* 3. ***MARCH;*** 4. ***COMPANY;*** 5. ***HALT.***

697. He then draws saber and commands: 1. *Prepare for inspection;* 2. ***MARCH;*** 3. ***FRONT.***

At the first command the captain goes to the right of the company, at a trot or gallop, and takes post facing to the left, 8 yards in front of the guidon; and the trumpeters take post 2 yards to the right of and abreast of the guidon.

At the second command, the chiefs of platoons move forward 8 yards, and the drivers and all individually mounted men dress to the right.

The captain verifies the alignment of the chiefs of platoons of the mounted men in line and of the carts, returns to his post in front of the guidon on line with the chiefs of platoons, commands ***Front,*** and faces to the front.

The chiefs of platoons cast their eyes to the front as soon as the alignment is verified.

The captain then faces to the left and commands: 1. ***Inspection;*** 2. ***PISTOL.*** As the inspector approaches, the men take the position of inspection pistol and the trumpeters raise their trumpets for inspection. Revolvers are returned as soon as inspected.

The inspector begins the inspection by passing around and inspecting the chiefs of platoons, who, after being inspected, face to the rear and remain at ease at their posts unless directed to assist in the inspection. The inspector then goes to the right of the company and inspects the trumpeters and guidon, after which he inspects each section in turn, commencing at the right flank, passing along the front of the sections, and returning in the rear of the sections.

To inspect the company more minutely, the captain may cause the men to dismount, and without forming ranks, conduct the inspection.

To inspect the technical signal equipment carried, the captain dismounts the company, if not already dismounted, forms ranks and commands: 1. ***Inspection;*** 2. ***EQUIPMENT.***

At this command the horses of the sections are turned over to the horse holders, and the men fall in, in front of their horses. The chiefs of section then march the sections by the right flank of the sections to the rear of the carts or pack mules, faces them to the front, and commands ***FALL OUT.***

The equipment is then removed from the carts or mules and placed upon the ground in the following order, from right to left:

ARRANGEMENT OF INSTRUMENTS FOR INSPECTION FROM RIGHT TO LEFT.

Wireless.

Batteries.
Pack chest.
Antenna and counterpoise box.
Mast.

Wire.

Buzzers, field.
Buzzers, cavalry.
Ground rods.
Kits, inspection pocket.
Pads, message.
Carriers, wire.
Hatchets.
Pikes, wire.
Flags, etc.

When the equipment has been laid out, the sections will form in single rank, in rear of the equipment, facing to the front.

Upon the completion of the inspection of a section, its equipment is replaced without command and the section is formed and marched back to the horses, where the men resume their horses and stand at ease, until the completion of the inspection. All sections, when not being inspected, stand at ease awaiting the approach of the inspector, and are brought to attention by the chief of sections on his approach.

When the captain dismounts the company, the guidon dismounts with it; the chiefs of platoons return saber, dismount, and stand to horse facing their platoons; the captain returns saber and dismounts and his horse is held by a trumpeter. If the arms are not to be inspected, the commands therefor are omitted.

The chiefs of platoons, when the inspection of the rank begins, face toward the company and remain at ease, resuming front on the completion of the inspection of arms, or the captain may require them to assist him. If dismounted, their horses are held by trumpeters. The captain may require each chief to inspect his own platoon while he makes a general inspection.

While inspecting the company or accompanying the inspector the captain does not return his saber while mounted; if dismounted, he returns saber.

On completion of the inspection the captain brings the company to attention, commands: 1. ***Prepare to mount;*** 2. ***MOUNT;*** 3. ***FORM;*** 4. ***RANKS,*** and then commands ***Posts.*** At this command the chiefs of platoons turn to the left about, move forward, and resume their posts by another left about, and the trumpeters take their posts.

Should the inspector be other than the captain, the latter prepares the company for inspection and awaits the arrival of the inspector. Upon the approach of the inspector the captain at his post in front of the guidon salutes, the inspector returns the salute and informs him of the character of the inspection desired; the captain gives the necessary commands, faces to the front, and, when inspected, accompanies the inspector.

698. The company carries for inspection every article that is prescribed as a part of the regular equipment and for which there is a specially designated place on the horses or wagons.

COMPANY INSPECTION DISMOUNTED.

699. The company being in line, the officers at carry saber, the captain commands: 1. ***Prepare for inspection;*** 2. ***MARCH;*** 3. ***FRONT.***

At the first command the noncommissioned officers on the right of each section step backward 2 yards to mark the new alignment of the rear rank; the file closers step backward 2 yards in rear of this line. The captain goes to the right flank and sees that the guides are on a line parallel to the front rank, then places himself facing to the left, 4 yards in front of and 2 yards to the right of the company, and commands: ***March.***

At the command ***March,*** the chiefs of platoons step forward 2 yards, the chiefs of sections step forward 1 yard, and all dress to the right. The front rank and file closers dress to the right; the rear rank steps backward, halts a little in rear of the line, and then dresses to the right.

The captain aligns the chiefs of platoons and of sections, the ranks and the file closers; the chiefs of platoons and of sections and the file closers turning their heads and eyes to the front as soon as their alignment is verified. He then resumes his post in front of the right of the company and commands *Front.*

At this command the guides marking the line of the rear rank move forward into the front rank and all cast their eyes to the front.

The captain then commands: 1. *Inspection;* 2. *PISTOL.*

700. The captain returns saber, inspects the chiefs of platoon and of sections, the ranks, and the file closers, beginning on the right of each and returning by the left and rear. During the inspection of the ranks the lieutenants face about and stand at ease; they may be directed to accompany the captain or to assist in the inspection. Upon the completion of the inspection the lieutenants face to the front and resume the attention; and the captain commands *posts,* upon which the rear rank and file closers step forward to their original positions, and the chiefs of platoons and of sections resume their posts by making an about face, stepping forward 2 and 1 yards, respectively, and then making another about face.

701. Should the inspector be other than the captain, the latter prepares the company for inspection and when the inspector approaches brings the company to attention, and from his post in front of the right of the company salutes. The salute acknowledged, the captain carries saber, faces to the left, commands: 1. *Inspection;* 2. *PISTOL,* and again faces to the front.

The inspection proceeds as before; the captain returns saber and accompanies the inspector as soon as the latter has inspected him.

At inspection of quarters the inspector is accompanied by the captain and followed by the other officers, or by such of them as he may designate; the men, without accouterments, stand uncovered near their respective bunks; in camp they stand covered, without accouterments, in front of their tents; upon the approach of the inspector the first sergeant commands *attention,* salutes, and leads the way through the quarters or camp.

BATTALION INSPECTION MOUNTED.

702. The battalion being in column of companies, on the approach of the inspector the major commands: 1. *Prepare for inspection;* 2. *MARCH.*

The companies are prepared for inspection as already prescribed.

The trumpeters join their companies. The drum major conducts the band, if there be one, to the rear of the column, passing by the right flank, and places it facing to the front 36 yards in rear of the rear company, and opens ranks.

The battalion staff officers place themselves in line with 1 yard intervals about 30 yards in front of the column, opposite the center, in order of rank from right to left; the noncommissioned staff form in a similar manner 6 yards in rear of the staff officers; the guard of the standard marches to the front and takes post 6 yards in rear of the center of the line of the noncommissioned staff. The major takes post in front of the center of the column 6 yards in front of the staff.

Field and staff officers senior in rank to the inspector do not take post in front of the column, but accompany him.

The inspector inspects the major and, accompanied by the latter, inspects the staff officers.

The major and his staff, as soon as inspected, return saber and accompany the inspector. The noncommissioned staff officers return saber when inspected.

The inspector, commencing at the head of the column, inspects the noncommissioned staff, guard of the standard, and band. The noncommissioned staff and guard of the standard may be dismissed as soon as inspected.

The captain of each company not undergoing inspection dismounts his men and brings the men to *rest*. As the inspector approaches the company the captain brings it to attention and mounts the men; as soon as he himself has been inspected, he gives the necessary commands, returns saber, and accompanies the inspector. The inspector proceeds as in company inspection. At its completion the captain commands *posts,* dismounts his men, if not already dismounted, and brings the company to rest. Upon intimation from the inspector the major may direct that each company in turn be dismissed as soon as inspected.

The band plays during the inspection of the companies.

When the inspector approaches the band the adjutant commands: 1. *Inspection;* 2. *INSTRUMENTS,* and the band is inspected as prescribed in paragraph 735.

703. The battalion may be inspected in line. The inspection is conducted according to the same principles as when formed in column. The major and his staff are inspected at their posts in front of the center of the line; the band, which remains at its post on the right, is next inspected; then the companies in order from right to left.

704. If the major is himself the inspector the inspection is conducted according to the same principles.

705. At dismounted inspection the companies of the battalion will be separately inspected, dismounted, on their own parade grounds.

CHAPTER IV.—MUSTER.

BATTALION OR COMPANY MUSTER.

706. Muster is held in line or in column of companies in line.

The adjutant is provided with a muster roll of the field staff and band; each captain, with the roll of his company. A list of absentees alphabetically arranged, showing cause and place of absence, accompanies each roll.

As the mustering officer approaches a company the captain commands: *Attention to muster.* The mustering officer or the captain then calls the names on the roll, and as each man's name is called he answers *here* and dismounts.

After muster the mustering officer verifies the presence of the men reported absent from the formation, but in the post or camp.

If the company be mustered dismounted, as each man's name is called he answers *HERE* and steps one pace to the front.

The formation for dismounted muster of the company is the same as for company inspection dismounted, the muster being usually preceded by an inspection.

CHAPTER V.—FUNERAL ESCORT.

707. The composition and strength of the escort are prescribed in Army Regulations.

The escort is formed with its center opposite the quarters of the deceased, the mounted men in line to the front; the band (or musicians) on that flank of the escort toward which it is to march.

Upon the appearance of the coffin the commander of the escort commands: 1. *Present;* 2. *SABER,* if sabers are worn, otherwise he alone salutes, and the band plays an appropriate air; sabers are then brought to the carry, and the escort is formed in section column.

The procession is formed in the following order: 1. ***Music;*** 2. ***Escort;*** 3. ***Clergy;*** 4. ***Coffin and pallbearers;*** 5. ***Mourners;*** 6. ***Members of the former command of the deceased;*** 7. ***Other officers and enlisted men;*** 8. ***Distinguished persons;*** 9. ***Delegations;*** 10. ***Societies;*** 11. ***Civilians.***

Officers and enlisted men (Nos. 6 and 7), with side arms, are in the order of rank, seniors in front.

The escort marches at a walk to solemn music, and on arriving at the grave is formed in line with the center opposite the grave; the sections then form line to the front; the coffin is carried along the front of the escort to the grave; sabers are presented, and the band plays an appropriate air; the coffin having been placed over the grave, the music ceases and sabers are carried.

After the coffin is lowered into the grave and the funeral services are completed, a trumpeter sounds taps over the grave.

The escort is then formed into column, marched to the point where it was assembled, and dismissed.

The band does not play until it has left the inclosure.

The funeral ceremony for an enlisted man is the same as for an officer, except that the commands ***present*** and ***carry saber*** are omitted; the sergeant in command of the escort salutes with the hand on the appearance of the coffin at the quarters of the deceased and also when the coffin is carried along the front of the escort to the grave.

When the distance to the place of interment is considerable, the escort after leaving the camp or garrison may march ***at ease*** until it approaches the burial ground, when it is brought to attention. The music does not play while marching ***at ease.***

In marching at attention the field music may alternate with the band in playing.

708. When it is impracticable for the horses and carts to approach the grave, they are left outside the inclosure. If the escort consists of Signal Corps only, the officers, noncommissioned staff officers, and all individually mounted men dismount, turn over their horses to the horse holders, and the officers draw saber; a suitable formation is then taken and the coffin is escorted to the grave, where line is formed and the same ceremonies are performed as before prescribed. The ceremony at the grave having been completed, the command remains in line until the trumpeter sounds taps over the grave.

709. Should the entrance to the cemetery prevent the hearse accompanying the escort till the latter halts at the grave, the column is halted at the entrance long enough to take the coffin from the hearse, when the column is again put in march. The Cavalry, Artillery, and Signal Corps of the escort, when unable to enter the inclosure, turn out of the column and salute the coffin as it passes.

710. In all funeral ceremonies six pallbearers will be selected as far as practicable from the grade of the deceased. If the deceased is a commissioned officer, the coffin is borne by six commissioned officers; if a noncommissioned officer or private, by six privates.

711. When arms are presented at the funeral of a general officer, the trumpters sound the *march* or *flourishes,* according to the rank of the deceased, after which the band plays an appropriate air.

712. At the funeral of a mounted officer or enlisted man, his horse, in mourning caparison, follows the hearse.

713. When necessary to escort the remains from the quarters of the deceased to the church before the funeral service, arms are presented upon receiving the remains at the quarters and also as they are borne into the church.

714. Before the funeral the commander of the escort gives the clergyman and pallbearers all needed directions.

CHAPTER VI.—COMPANY GUARD MOUNTING.

715. At the assembly the men warned for stable or other guard duty fall in on the company parade in two ranks, facing to the front; the senior noncommissioned officer on the right of the front rank, the other noncommissioned officers and the supernumerary in the file closers.

The first sergeant verifies the detail, dresses it to the right, and inspects the arms, equipment, and appearance of the men, and replaces by the supernumerary any man unfit to march on guard.

He then takes post 4 yards to the front of the detail facing it, and commands: 1. ***Guard to its post;*** 2. ***Right;*** 3. ***Face;*** 4. ***Forward;*** 5. ***MARCH.***

At the fifth command the guard moves to its post; the senior noncommissioned officer marching near its left and rear, his place as guide being taken by a file closer. The supernumerary is then dismissed.

When an officer mounts the guard he will take post 6 yards in front of the detail; the first sergeant will salute and report to him the result of his verification of the detail and will then face to the left and take post 2 yards to the left of the front rank. The officer will inspect the detail and march the guard to its post as above described.

716. On arrival at the guardhouse or other designated place the commander of the old guard will give the commander of the new guard all the information and instructions relating to his guard and turn over to him all property or prisoners in his charge. The guard will then be divided into reliefs and the men designated for the different posts, less the commander of the guard, and the members of the first relief will relieve the corresponding members of the relief of the old guard on post. When all of the members of the old guard have been relieved the old guard will be dismissed by its commander.

PART VIII.

MISCELLANEOUS.

THE GUIDON.

717. ***The position of carry guidon, dismounted.***—The lance of the guidon is held vertically in the right hand, thumb in front of the lance, forefinger along the side, ferrule about 6 inches from the ground. It is thus carried in marching.

When leading the horse the lance is held in a corresponding position in the left hand.

718. ***The position of order guidon.***—The ferrule of the lance rests on the ground on a line with and touching the toe of the right shoe; the right hand grasps the lance in the same manner as when at a carry.

719. ***The position of parade rest.***—The ferrule of the lance is on the ground as at the order; the lance is held with both hands in front of the body, left hand uppermost.

720. ***To mount and dismount—The position of carry guidon, mounted.***—At stand to horse the ferrule of the lance rests on the ground on a line with and touching the toe of the left shoe, lance vertical and supported by the left hand; hand at the height of the neck, elbow and forearm closed against the lance.

Preparatory to mounting, grasp the reins and a lock of the mane in the left hand, lance held in the same hand, reins on the near side of the lance; place the right hand on the pommel and mount in the usual manner. After mounting, grasp the lance with the right hand under the left, which lets go of it without quitting the reins; carry the lance to the right side, lower and place the ferrule in the stirrup socket. The right hand then grasps the lance, forearm nearly horizontal, the arms through the sling, lance vertical; this is the position of ***carry guidon, mounted.***

Dismounting with the guidon is executed in a manner the reverse of the foregoing.

(NOTE.—Mounting and dismounting with the wire pike should be similarly executed.)

721. *Salutes—Being mounted.*—Lower the guidon to the front until the lance (under the right arm) is horizontal.

Being dismounted.—Slip the right hand up the lance as high as the eye, then lower the lance to the front by straightening the right arm to its full extent.

If marching, the salute is executed when at 6 yards from the officer entitled to the salute; the carry is resumed after passing 6 yards beyond him.

At the halt the salute is executed at the command *present saber* (or *arms*); the carry is resumed at the command *carry saber* (or *arms*).

THE STANDARD.

722. Whenever in these regulations the term *the standard* is used it includes both the national and the regimental standards; if either alone is to be referred to, the term *the national standard* or *the regimental standard* is used.

723. The manual of the standard is as prescribed for the guidon except that at carry standard, dismounted, the ferrule of the lance is supported at the right hip.

The standard salutes an officer entitled to the honor, but in no other case.

724. *The guard of the standard.*—The guard of the standard consists of the color sergeants and of two experienced men selected by the colonel. The guard is habitually formed in line, the color sergeants in the center.

The national standard is carried by the senior color sergeant, who is nearest to the right flank of the guard and who commands the guard. The signal-corps standard is carried by the other color sergeant. The latter conforms to the movements of the former, maintaining his position on the left.

The standard, kept at the quarters or office of the commanding officer, is escorted by the guard to the place of formation of the battalion and is similarly returned.

725. *Post of the standard.*—At the formation of the battalion, as soon as the companies have taken their places, the guard of the standard takes post midway between the two center companies, in line, abreast of the front ranks of the sections; in column, at the center of the column.

If the formation of the battalion is changed from line to column or the reverse, the standard conforms to the movement, taking its new position by the most direct route.

When during exercises the battalion formation is broken up, the standard joins the commanding officer or is dismissed, as may be directed by the adjutant.

THE SABER.

726. Officers are armed with the saber.

At ceremonies sabers are habitually drawn. In route marches they are habitually in the scabbard. At other times they are drawn or in the scabbard, in the discretion of the officer in command; when he draws or returns saber, officers and noncommissioned staff officers under his command draw and return saber with him.

For dismounted duty the saber is attached to the belt, and is kept hooked up except when drawing and returning saber.

For mounted duty the saber is habitually attached to the left side of the saddle; in full dress it is attached to the belt, unless otherwise directed by the commanding officer. The saber is not removed from the saddle when dismounting temporarily for the performance of some duty on foot.

727. ***To draw the saber—The position of carry saber.***—Unhook the saber with the thumb and first two fingers of the left hand, thumb on the end of the hook, fingers lifting the upper ring; grasp the scabbard with the left hand at the upper band, bring the hilt a little forward, seize the grip with the right hand and draw the saber quickly, raising the arm to its full extent to the right front at an angle of about 45° with the horizontal, the saber, edge down, in a straight line with the arm; make a slight pause and bring the back of the blade against the shoulder, edge to the front, arm nearly extended, hand by the side, elbow back, third and fourth fingers back of the grip; at the same time hook up the scabbard with the thumb and first two fingers of the left hand, thumb through the upper ring, fingers supporting it; drop the left hand by the side. This ***is the position of carry saber dismounted.***

To draw the saber when mounted, reach with the right hand over the bridle hand, and, without the aid of the bridle hand, draw the saber as before. The right hand at the carry rests on the right thigh.

728. The saber if drawn is, while at attention, habitually held at the carry, except when dismounted and moving in double time; in the latter case it is carried diagonally across the breast, edge to the front, the left hand steadying the scabbard.

729. Being at carry saber: 1. ***Present;*** 2. ***SABER.***

For officers: At the command ***present*** raise and carry the saber to the front, base of the hilt as high as the chin and 6 inches in front of the neck, edge to the left, point 6 inches farther to the front than the hilt, thumb extended on the left of the grip, all the fingers grasping the grip. At the command ***saber*** lower the saber, point in prolongation of the right foot and near the ground, edge to the left, hand by the side, thumb on left of grip, arm extended. If mounted, the hand is lowered behind the thigh, point a little to the right and front of the stirrup.

730. Being at present saber: 1. ***Carry;*** 2. ***SABER.***

At the command ***saber,*** resume the position of carry saber.

731. Being at carry saber: 1. ***Parade;*** 2. ***REST.***

Take the position of parade rest (Par. 49), point of saber on or near the ground in front of the center of the body, edge to the right.

At the command ***attention,*** resume the carry saber and the position of the soldier.

732. ***To return saber.***—Carry the right hand opposite to and 6 inches from the left shoulder, saber vertical, edge to the left; at the same time unhook and lower the scabbard with the left hand and grasp it at the upper band; drop the point to the rear and pass the blade across and along the left arm; turn the head slightly to the left, fixing the eyes on the opening of the scabbard, raise the right hand, insert and return the blade; turn the head to the front, drop the right hand by the side, hook up the scabbard with the left hand, drop the left hand by the side.

When mounted the saber is returned without using the left hand.

THE BAND.

733. The band is generally formed in column of fours. It may be formed in two or more ranks.

Dismounted the band is formed in two or more ranks, with sufficient intervals between the men and distances between the ranks to permit a free use of the instruments.

The drum major is 3 yards (dismounted, 2 yards) in front of the center of the front rank. He gives the commands or signals for its movements. The commands are the same as for a squad, substituting in them *band* for *squad.*

In line the band is posted with the left of its front rank 36 yards to the right of the right company. In column it marches with its rear rank 36 yards in front of the leading company or its front rank 36 yards in rear of the rear company, according as the column has been formed to the right or the left.

Dismounted the band takes post as when mounted.

When united the musicians form in rear of the band. When the band is not present the posts, movements, and duties of the musicians are the same as prescribed for the band.

In rendering honors, whenever the standard salutes, the musicians sound the *march, flourishes,* or *to the standard,* at a signal from the drum major.

In marching, the different ranks dress to the right.

When the command with which the band is posted faces to the rear the band executes the countermarch. The intervals are increased before executing a countermarch and closed upon the completion of the countermarch.

In executing the countermarch the men in the leading rank, or four to the right of the drum major, turn individually to the right about, and those to his left to the left about, each followed by the men covering him in the column. The drum major passes through the center.

In dismounted formations, when right, left, or about face is executed, the band faces in the same manner.

SIGNALS OF THE DRUM MAJOR.

734. The signals for the movements of the band will correspond to the saber signals (par. 344) as far as practicable.

Prepare to play.—Take the first position of present saber.

Play.—Thrust upward energetically with the saber, arm fully extended, and quickly resume the carry.

Prepare to cease playing.—Same as prepare to play.

Cease playing.—Same as play.

The march or flourishes.—1. *Prepare to play:* Raise the hand to the height of the forehead and hold the saber in a horizontal position, point to the left. 2. *Play:* Lower the hand quickly to the belt and resume the carry.

Increase intervals.—Extend the arm to the front, and wave the saber several times to the right and left in front of the body.

TO INSPECT THE BAND.

735. *Being at the halt.—Prepare for inspection; MARCH; front.* The front rank dresses to the right; the other ranks move backward, each taking the distance of 3 yards (dismounted, 2 yards) from the rank preceding, halt and dress to the right. 1. *Inspection;* 2. *INSTRUMENTS.*

Each musician, as the inspector approaches him, raises his instrument in front of his body, reverses it so as to show the other side, and then returns it to its former position.

A trumpeter, when inspected, executes with his bugle what is prescribed for a band musician.

POSTS.

The front rank stands fast, the other ranks move up and close to the proper distance.

HONORS.

736. The national or regimental color or standard, uncased, passing an armed body, is saluted, the field music sounding *to the color.* Officers or enlisted men passing the uncased color render the prescribed salute; with no arms in hand, the salute is made by uncovering; the headdress is held in the right hand opposite the left shoulder, right forearm against the breast.

737. Whenever "The Star Spangled Banner" is played by the band on a formal occasion other than retreat at a military station, or at any place where persons belonging to the military service are present in their official capacity, all officers and enlisted men present stand at attention throughout the playing of the air. The same respect is observed toward the national air of any other country when it is played as a compliment to official representatives of such country. Whenever "The Star Spangled Banner" is played as contemplated by this paragraph, the air is played through once without the repetition of any part, except such repetition as is called for by the musical score. When the flag is lowered at retreat and aboard transports, when the flag is hoisted at guard mounting, all officers and enlisted men out of ranks stand at attention, facing the flag, while the air is being played, and at the last note of the music salute in the prescribed manner.

738. Troops under arms salute other armed bodies, the commanding officer, and his superiors; if halted in line, by persenting arms; if marching, eyes are turned in the direction of the person or body of troops saluted by the commands: 1. ***Eyes,*** 2. ***Right (Left),*** 3. ***Front;*** the command ***front*** is given when the person or body is passed. The commander of the troops salutes.

When troops are in column at a halt, the commander alone salutes; the present or eyes right (left) is omitted.

Troops are brought to attention when a body of troops or an officer entitled to a salute passes in rear.

Unarmed troops salute as prescribed for armed bodies, except that when halted the present is omitted.

The commander of a body of troops salutes, in person, his superior officers not mentioned above; the other officers and men of the command do not salute; the present or eyes right (left) is omitted.

Troops are brought to attention, if not already there, before their commander salutes.

739. No honors are paid by troops when on the march or in trenches, except that they may be called to attention; no salute is rendered when marching in double time.

740. The commander of a body of troops is saluted by all officers junior in rank and by all enlisted men. The salute is returned by the commander only.

741. All officers salute on meeting and in making and receiving official reports. Military courtesy requires the junior to salute first, but when the salute is introductory to a report made at a military ceremony or formation to the representative of a common superior—as, for example, to the adjutant, officer of the day, etc.—the officer making the report, whatever his rank, will salute first; when not otherwise prescribed in ceremonies the officer to whom the report is made will acknowledge by saluting that he has received and understood the report. When under arms the salute is made with the saber drawn;

otherwise with the hand. A mounted officer dismounts before addressing a superior not mounted.

On official occasions officers, when indoors and under arms, do not uncover, but salute with the saber if drawn; otherwise with the hand. If not under arms they uncover and stand at attention, but do not salute except when making or receiving reports.

742. Enlisted men carrying rifles, not in ranks, when within saluting distance salute an officer with the rifle salute, look toward him, and retain the left hand in position until the salute is acknowledged or he has passed.

If unarmed the salute is made in a similar manner with the hand farthest from the officer; if mounted the salute is made with the right hand.

If approaching an officer the salute begins when six paces from him.

Indoors and armed with a rifle, the salute is made from the position of the order on trail.

Officers are saluted whether in uniform or not.

743. An enlisted man, if seated, rises on the approach of an officer, faces toward him and salutes. If standing he faces the officer for the same purpose. If the parties remain in the same place or on the same ground, such compliments need not be repeated. Soldiers actually at work do not cease work to salute an officer unless addressed by him.

744. An enlisted man makes the prescribed salute with the weapon he is armed with, or, if unarmed, whether covered or uncovered, with the hand, before addressing an officer. He also makes the same salute after receiving a reply.

745. All salutes in passing or approaching are begun first by the junior at 6 paces distance, or at 6 paces from the nearest point of passing; no salutes, except as otherwise prescribed, are made at greater distances than 30 paces.

746. Indoors, an unarmed man uncovers and stands at attention upon the approach of an officer; he does not salute unless he addresses or is addressed by the officer. If armed, he salutes as heretofore prescribed, without uncovering.

747. When an officer enters a room where there are soldiers, the word *attention* is given by some one who perceives him, when all rise and remain standing in the position of a soldier until the officer leaves the room. Soldiers at meals do not rise.

748. Officers at all times acknowledge the courtesies of junior officers and enlisted men by returning their salutes. When several officers in company are saluted, all who are entitled to the salute return it.

749. Officers arriving at the headquarters of a military command, or at a military post, call upon the commander thereof as soon as practicable, and register their names. If the visiting officer be senior to the commander, the former may send a card, in which case it becomes the duty of the commander to make the first call.

750. Officers of the Navy are saluted according to their relative rank; officers of marines and of the volunteer forces or militia in the service of the United States, and officers of foreign services, are saluted according to rank.

751. Honors, courtesies, and ceremonies not referred to herein are found in Army Regulations and in the Manual of Guard Duty.

TRUMPET CALLS.

WARNING CALLS.

752. *First call, guard mounting, full dress, overcoats, drill, stable, water,* and *boots and saddles;* they precede the *assembly* by such intervals as may be prescribed by the commanding officer.

In camp, where the men are near their horses, and known to be present, the *assembly* may be sounded immediately after *boots and saddles,* in which case the men immediately proceed to the horses and saddle.

Mess, church, and *fatigue,* classed as *service calls,* may also be used as warning calls.

First call is the first signal for formation dismounted only; it does not precede, and is not used in connection with other warning calls, except *full dress* and *overcoats.*

Guard mounting is the first signal for guard mounting.

Boots and saddles is the signal for mounted formations or mounted drills; it immediately follows the signal *guard mounting* or *drill.*

The trumpeters assemble at *first call, guard mounting,* and *boots and saddles.*

When full dress or overcoats are to be worn, the ***full dress*** or ***overcoats*** call immediately follows ***first call, guard mounting,*** or ***boots and saddles.***

Call to quarters.—The signal for the men to repair to their quarters.

FORMATION CALLS.

753. ***Assembly.***—The signal for companies or details to fall in.

Adjutant's call.—The signal for companies to form battalion; also for the guard details to form for guard mounting on the camp or garrison parade ground; it follows the ***assembly*** at such interval as may be prescribed by the commanding officer.

To the standard.—Is sounded when the standard salutes.

Alarm Calls.

754. ***Fire call.***—The signal for the men to fall in, without arms, to extinguish fire.

To arms.—The signal for the men to fall in, under arms, on their company parade grounds as quickly as possible.

To horse.—The signal for mounted men to proceed under arms to their horses, saddle, mount, and assemble at a designated place as quickly as possible.

SERVICE CALLS.

755. ***Tattoo, taps, mess, sick, church, recall, issue, officers', captains', first sergeants', fatigue, school, and the general.***

The general is the signal for striking tents and loading wagons preparatory to marching.

Reveille precedes the ***assembly*** for roll call; ***retreat*** follows the ***assembly;*** the interval being only that required for formation and roll call, except when there is a parade.

Taps is the signal for extinguishing lights; it is usually preceded by ***call to quarters*** by such interval as prescribed by Army Regulations.

Assembly, reveille, retreat, adjutant's call, to the standard, the ***flourishes, ruffles,*** and the marches are sounded by all the field music united; the other calls, as a rule, are sounded by the musician of the guard or orderly musician; he may also sound the ***assembly*** when the musicians are not united.

The morning gun is fired at the first note of *reveille*, or, if marches be played before *reveille*, it is fired at the commencement of the first march.

The evening gun is fired at the last note of *retreat*.

DRILL SIGNALS.

756. The drill signals include both the preparatory commands and the commands of execution; the last note is the command of execution.

When a command is given by the trumpet, the chiefs of subdivisions give the proper commands orally.

The memorizing of these signals is facilitated by observing that all signals for movements to the right are on the ascending scale; that the signals for the same movements to the left are corresponding signals on the descending; that changes of gait are all on the same note; that *captain's call* is the first two bars of *officers' call* with the *attention* added.

Form rank and *posts* are the same.

The signals for the *turn* are preceded by the signal *platoons*, when the platoons are to execute the movement.

In sounding the signals for simultaneous movements, the signal *platoons* precedes the preliminary signal for the movement.

The signals are sounded in the same order as the commands are prescribed in the text.

TRUMPET CALLS.

To economize space, the music is written an octave higher than the trumpet scale, and is adjusted to the scale of the bugle.

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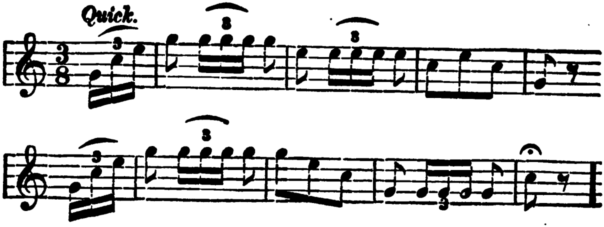
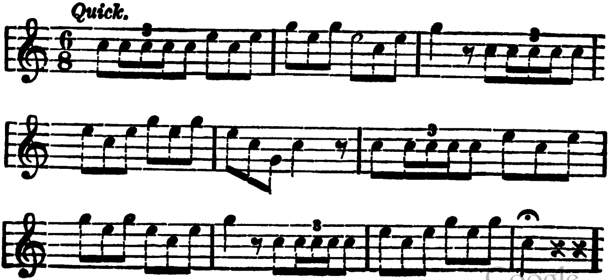
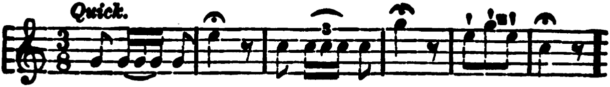
1. First Call.



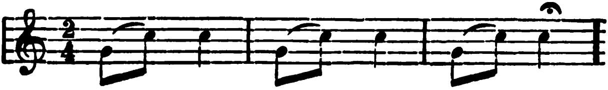
2. Guard Mounting.



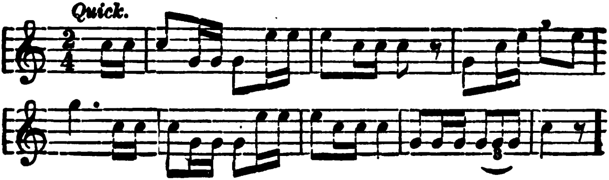
3. FULL DRESS.



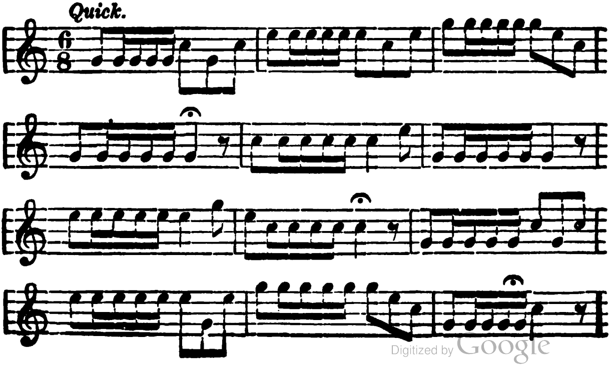
4. OVERCOATS.



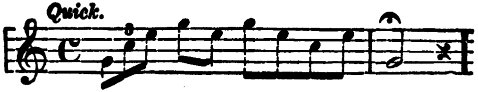
5. DRILL.



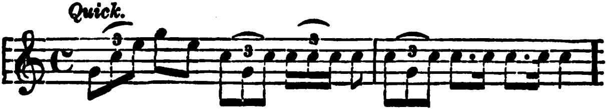
6. STABLE.



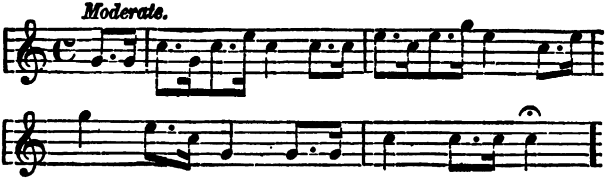
7. WATER.



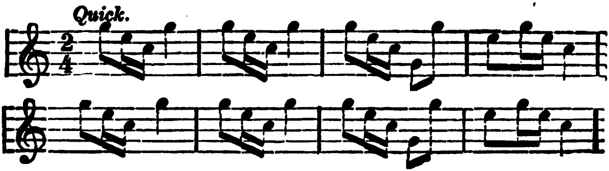
8. BOOTS AND SADDLES.



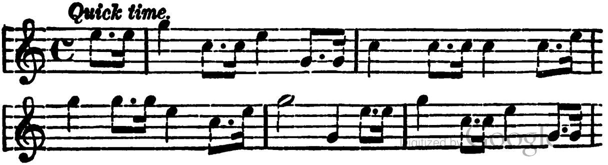
9. ASSEMBLY.



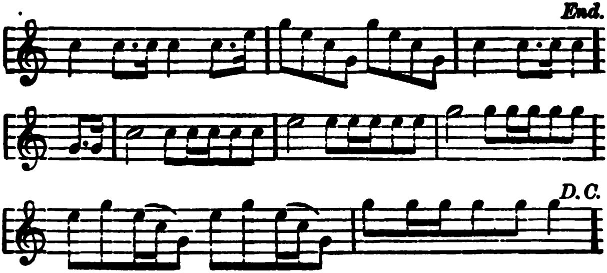
10. ADJUTANT'S CALL.



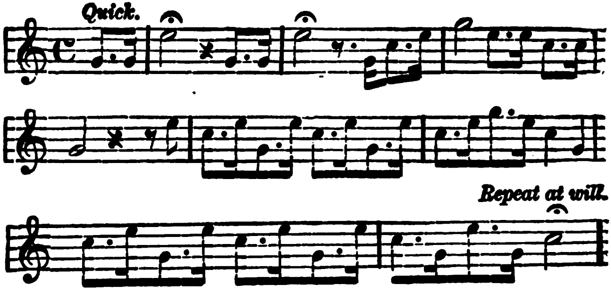
11. TO THE STANDARD.



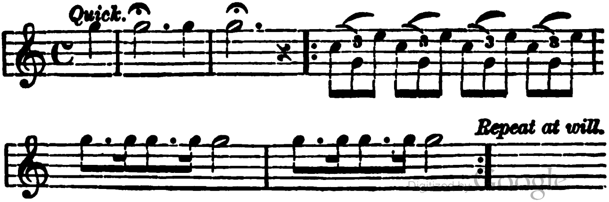
TO THE STANDARD—*Concluded.*



12. FIRE.

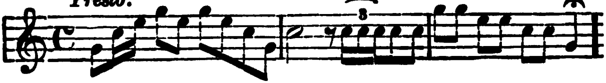


13. TO ARMS.



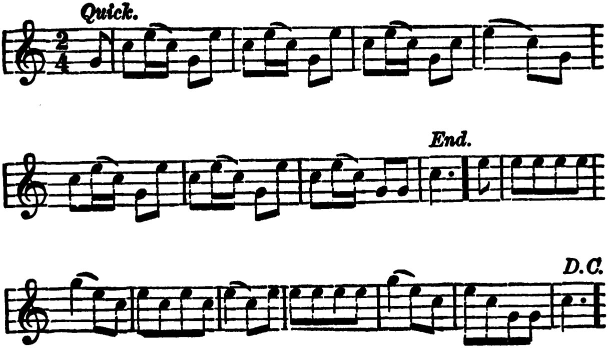
14. To Horse.

Presto.



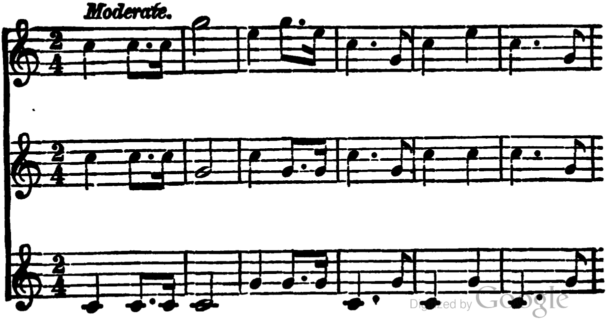
15. Reveille.

Quick.

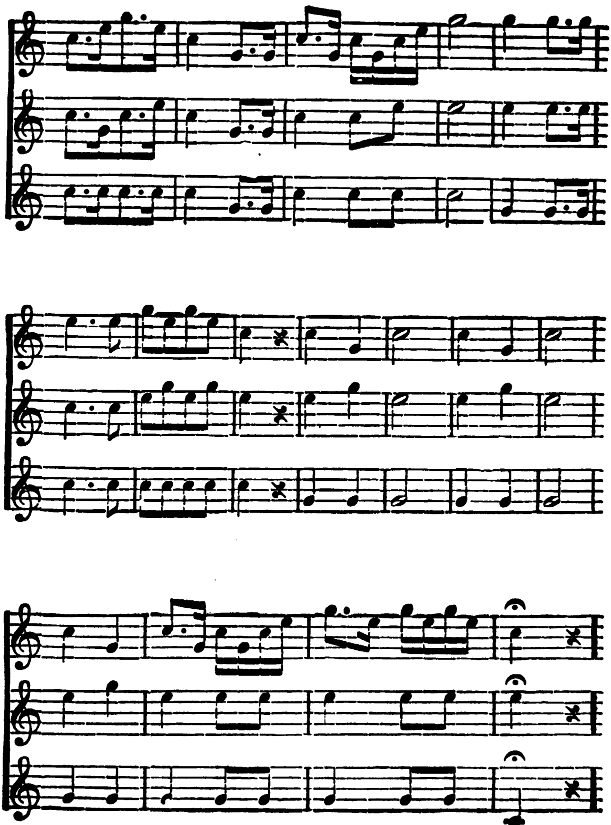


16. Retreat.

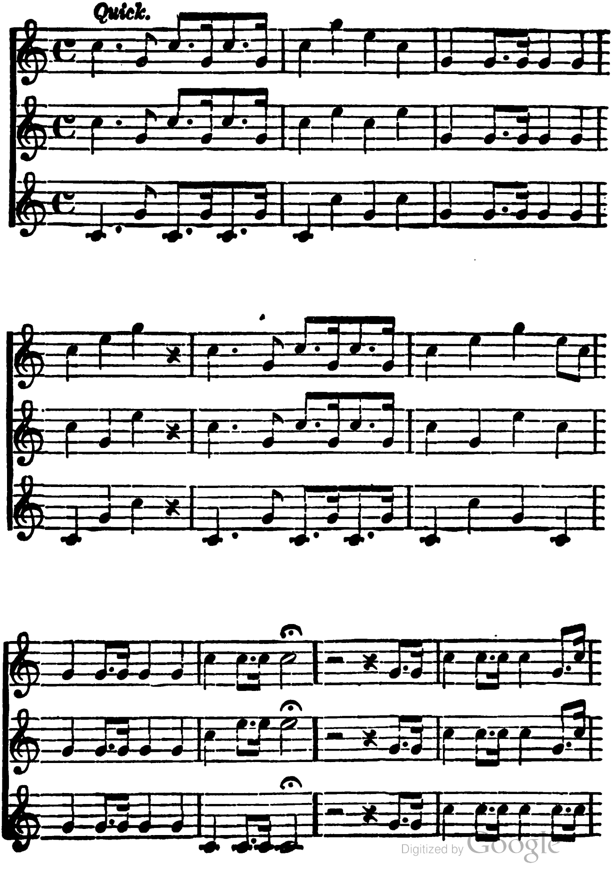
Moderate.



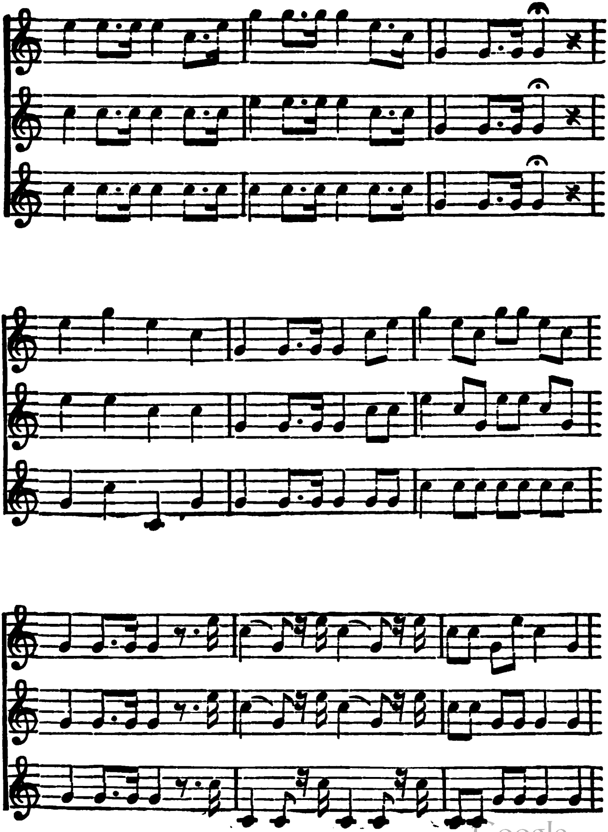
RETREAT—*Concluded.*



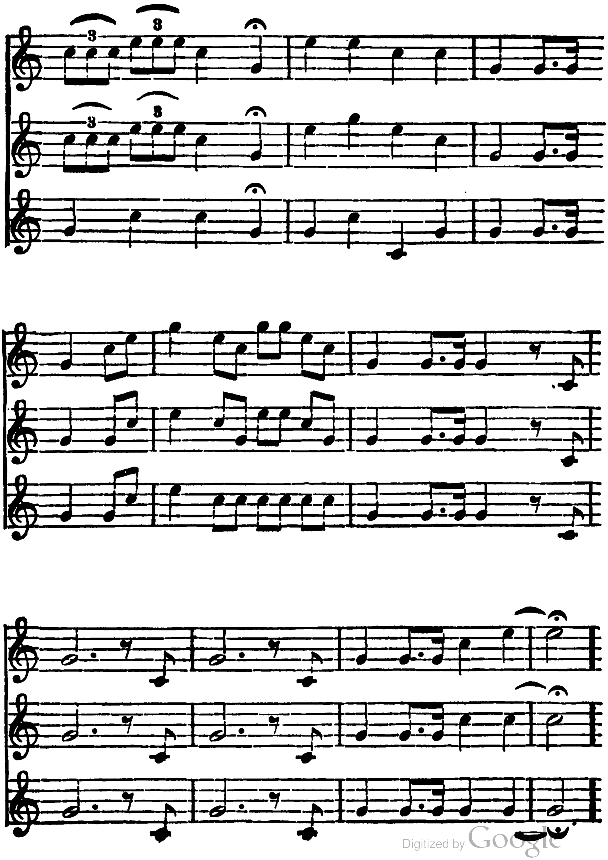
17. TATTOO.



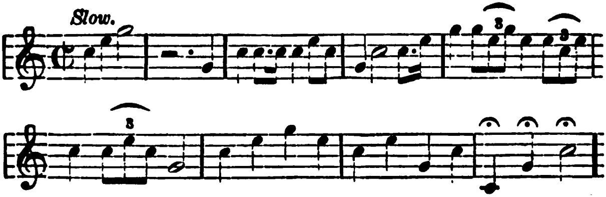
TATTOO—*Continued.*



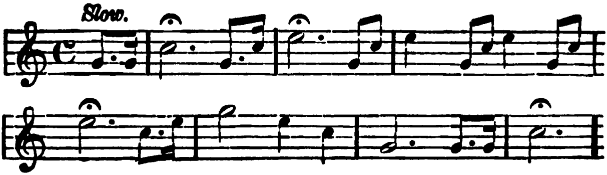
TATTOO—*Concluded.*



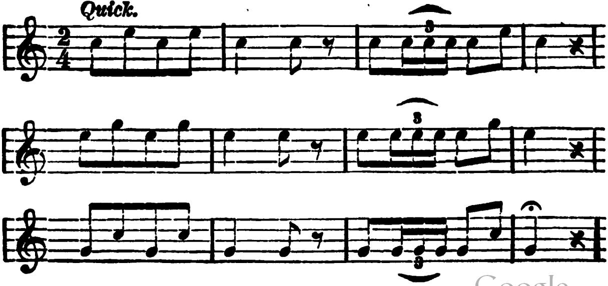
18. CALL TO QUARTERS.



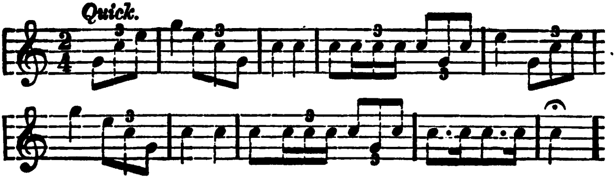
19. TAPS.



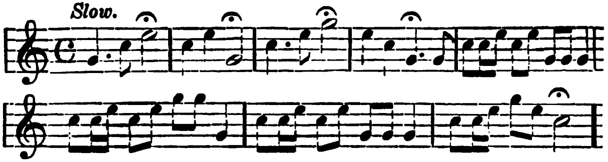
20. MESS.



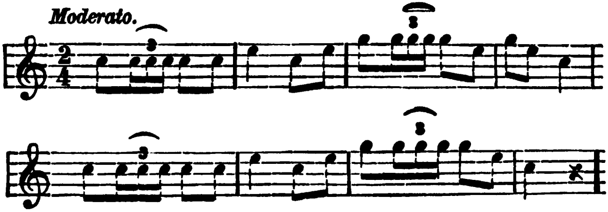
21. SICK.



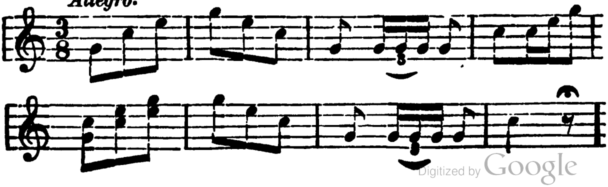
22. CHURCH.



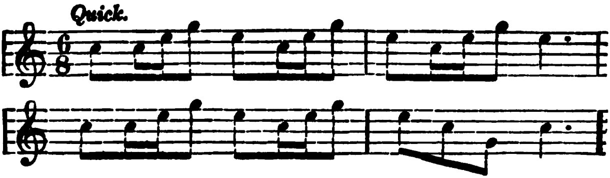
23. RECALL.



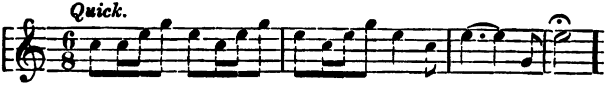
24. ISSUE.



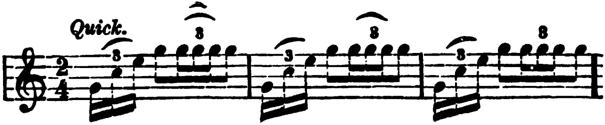
25. OFFICERS' CALL.



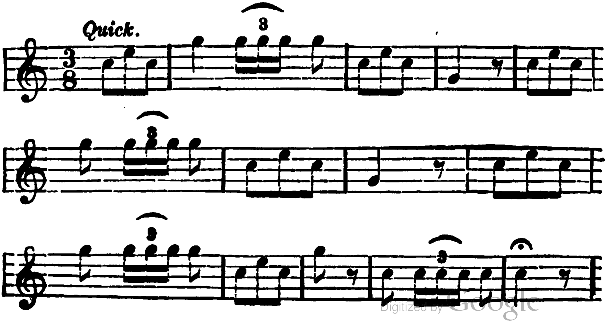
26. CAPTAINS' CALL.



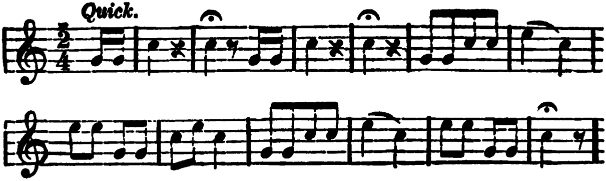
27. FIRST SERGEANTS' CALL.



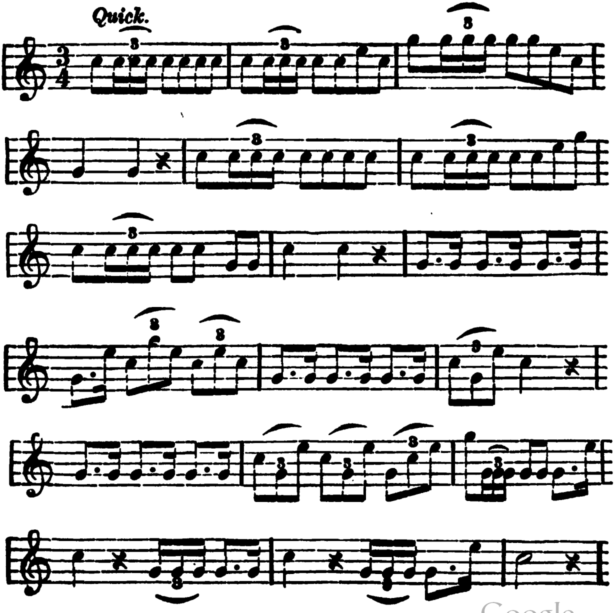
28. FATIGUE.



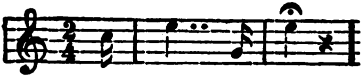
29. SCHOOL.



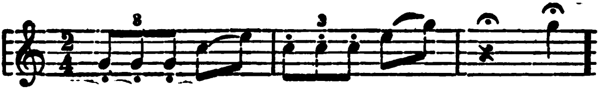
30. THE GENERAL.



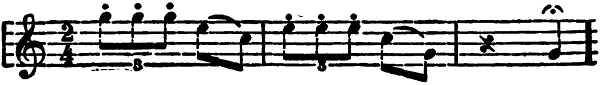
31. ATTENTION.



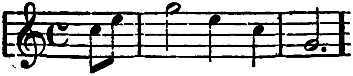
32. PREPARE TO MOUNT, MOUNT.



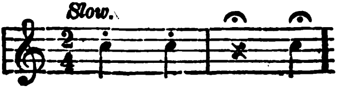
33. PREPARE TO DISMOUNT, DISMOUNT.



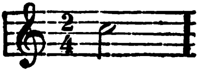
34. FORM RANK OR POSTS.



35. FORWARD, MARCH.

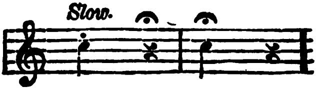


36. HALT.



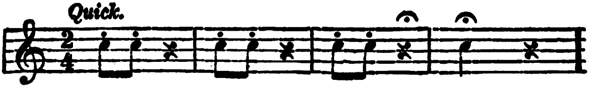
37. WALK, MARCH.

Slow.

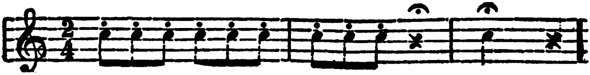


38. TROT, MARCH.

Quick.

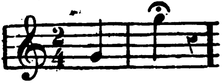


39. GALLOP, MARCH.



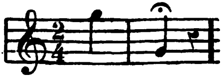
40. GUIDE RIGHT.

Slow.



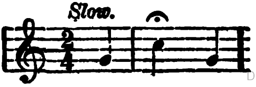
41. GUIDE LEFT.

Slow.

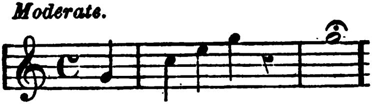


42. GUIDE CENTER.

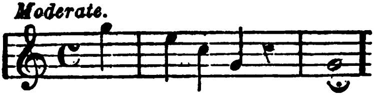
Slow.



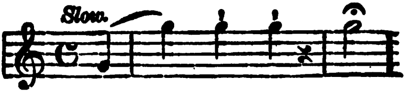
43. By the Right Flank, MARCH.



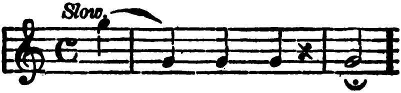
44. By the Left Flank, MARCH.



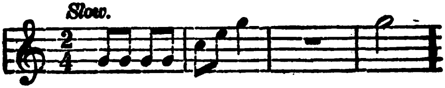
45. Right About, MARCH.



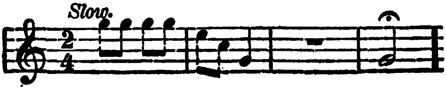
46. Left About, MARCH.



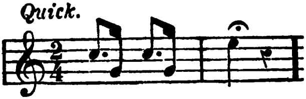
47. Column Right, MARCH.



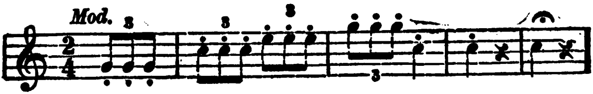
48. Column Left, MARCH.



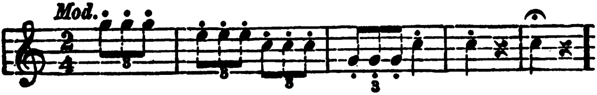
49. PLATOONS.



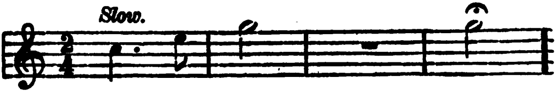
50. RIGHT TURN, MARCH.



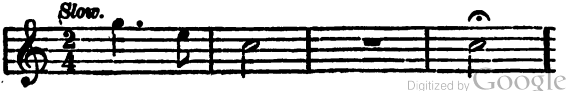
51. LEFT TURN, MARCH.



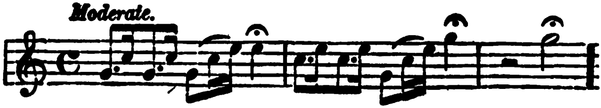
52. SECTIONS COLUMN HALF RIGHT, OR RIGHT OBLIQUE, MARCH.



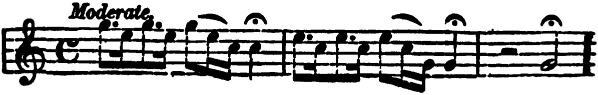
53. SECTIONS COLUMN HALF LEFT, OR LEFT OBLIQUE, MARCH.



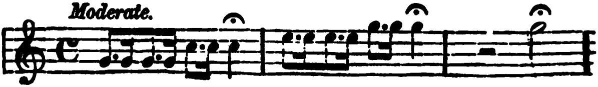
54. RIGHT FRONT INTO LINE, MARCH.



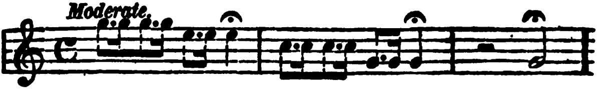
55. LEFT FRONT INTO LINE, MARCH.



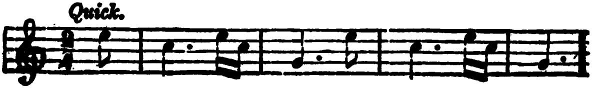
56. ON RIGHT INTO LINE, MARCH.



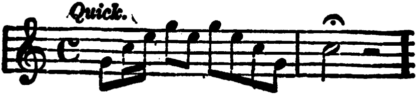
57. ON LEFT INTO LINE, MARCH.



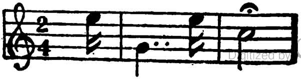
58. COMMENCE FIRING.



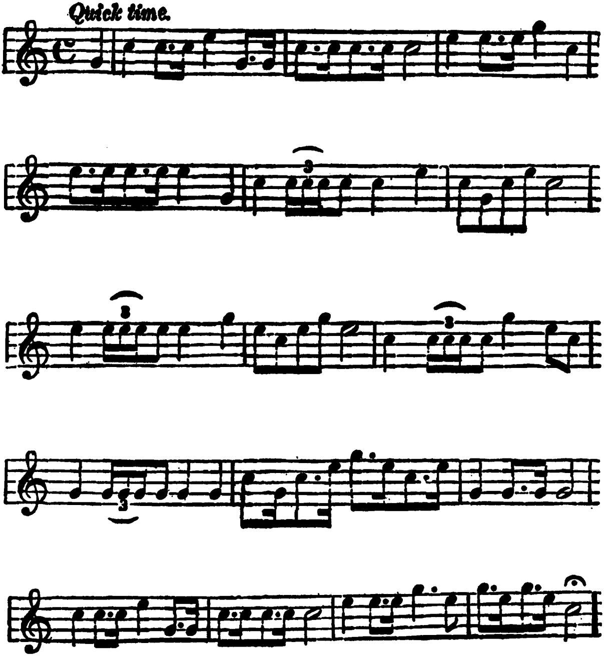
59. CEASE FIRING.



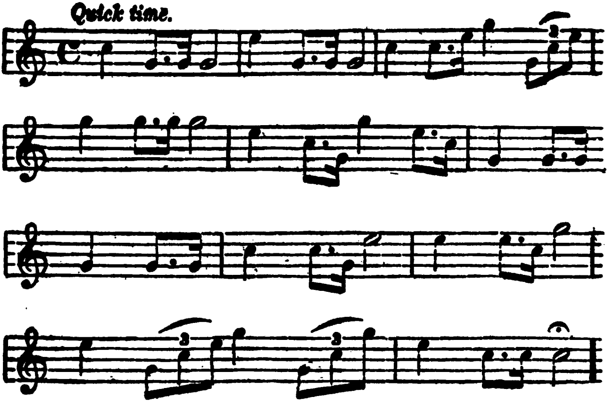
60. ROUTE ORDER.



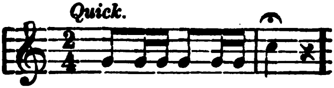
61. PRESIDENT'S MARCH.



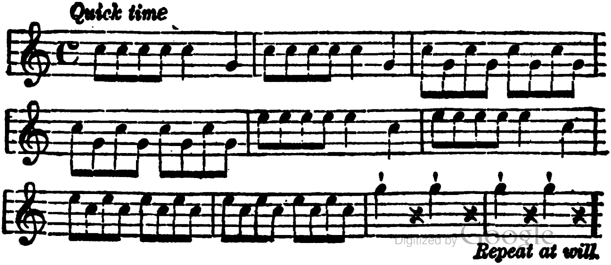
62. GENERAL'S MARCH.



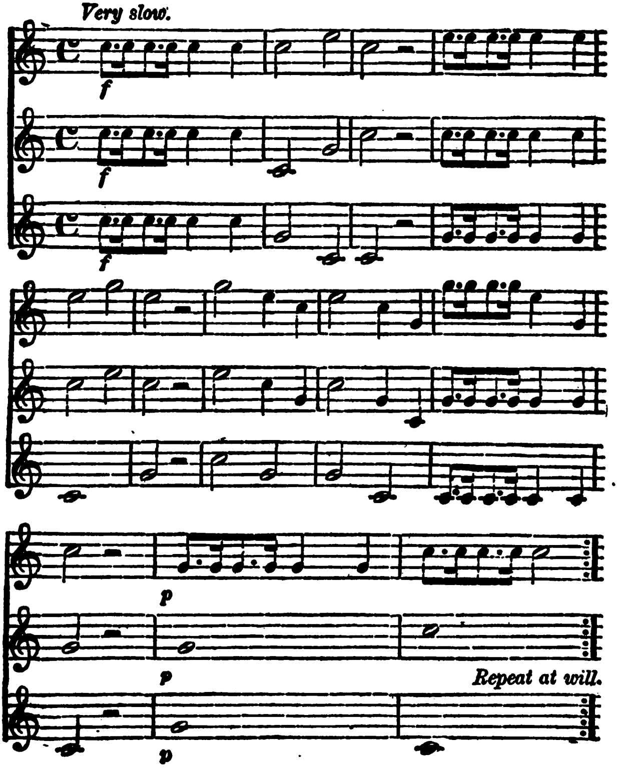
63. FLOURISHES FOR REVIEW.



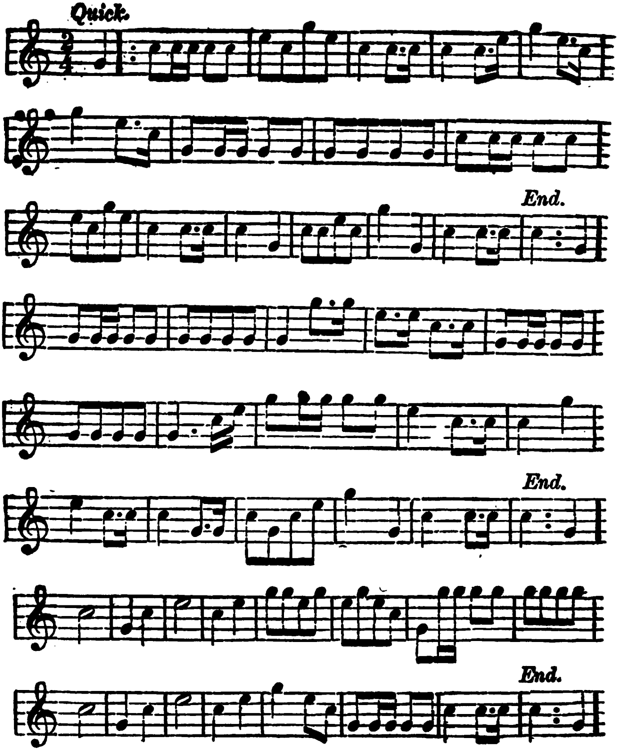
64. ROGUE'S MARCH.



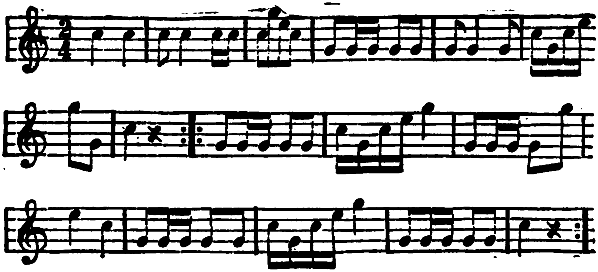
65. FUNERAL MARCH.



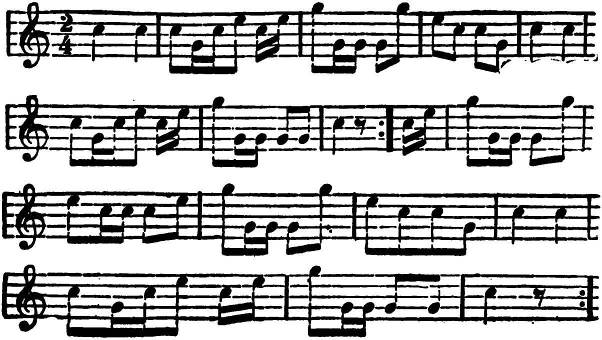
66. QUICKSTEP NO. 1.



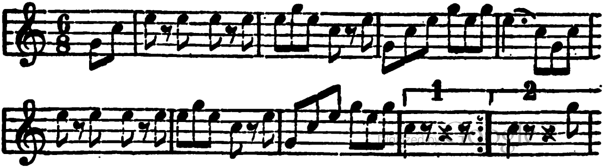
67. QUICKSTEP NO. 2.



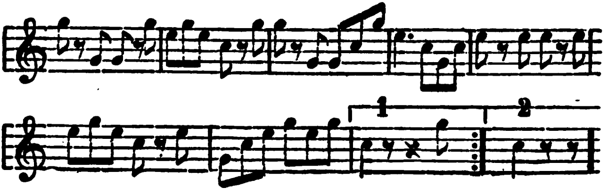
68. QUICKSTEP NO. 3.



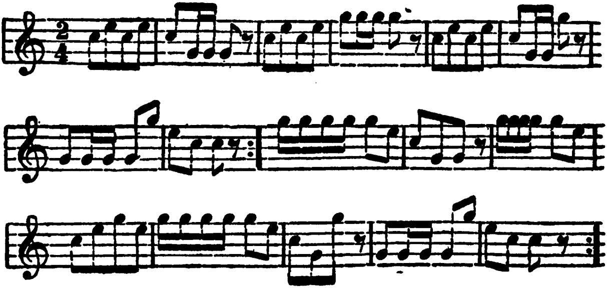
69. QUICKSTEP NO. 4.



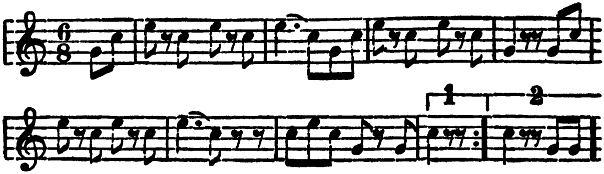
69. QUICKSTEP NO. 4—*Concluded.*



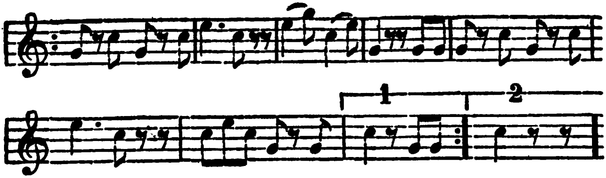
70. QUICKSTEP NO. 5.



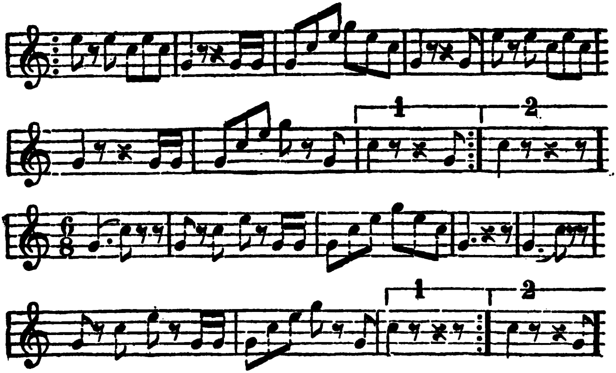
71. QUICKSTEP NO. 6.



71. QUICKSTEP NO. 6—*Concluded.*



72. QUICKSTEP NO. 7.



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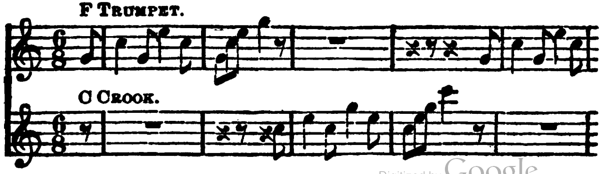
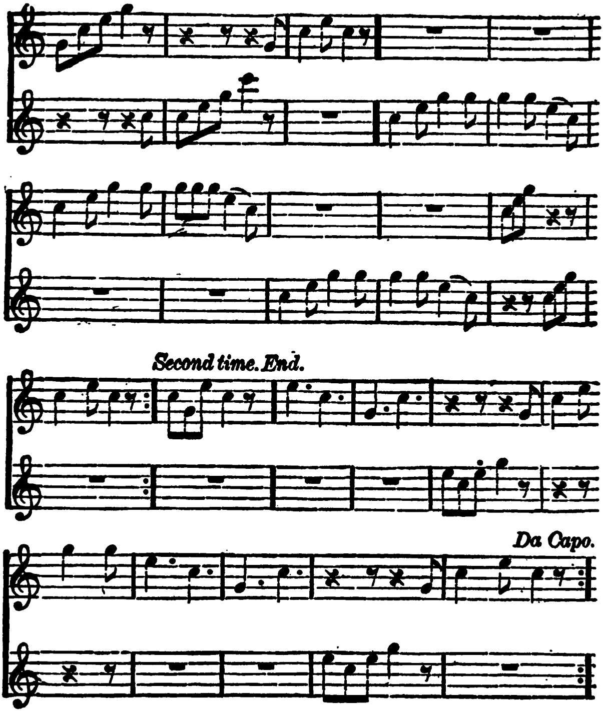


73. QUICKSTEP No. 8—*Concluded.*



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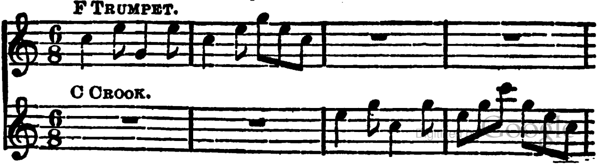
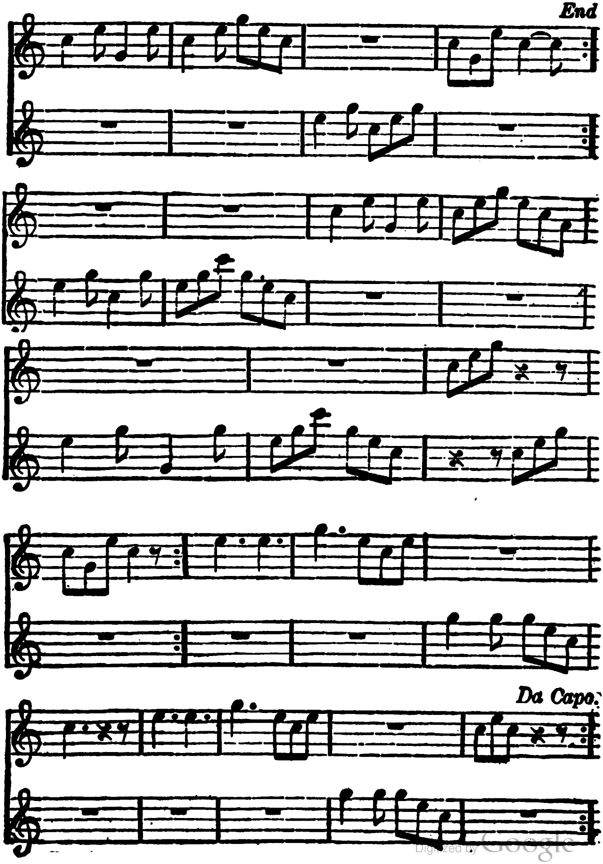
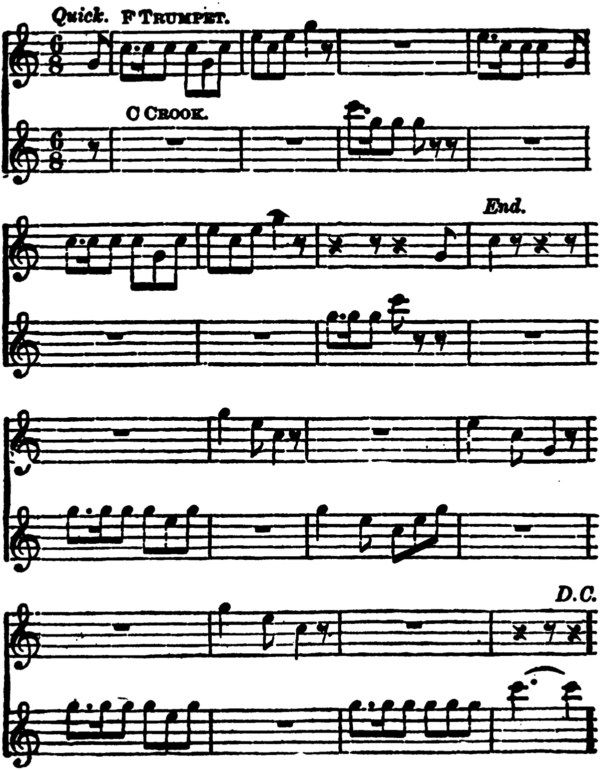


74. QUICKSTEP NO. 9—*Concluded.*



75. QUICKSTEP No. 10.



Arms and Equipment.

757. Arms and equipment of enlisted men, field company, Signal Corps, and equipment of animals:

(*a*) For each enlisted man—

- 1 revolver, approved type.
- 1 revolver holster.
- 1 revolver cartridge belt and fastener.
- 1 first-aid packet (medical department).
- 1 pouch for first-aid packet.
- 1 waist belt.
- 1 revolver cartridge box.
- 1 artillery knapsack.
- 1 canteen.
- 1 canteen strap, cavalry.
- 1 meat can.
- 1 cup.
- 1 knife.
- 1 fork.
- 1 spoon.
- 1 shelter tent, half.
- 1 shelter tent pole.
- 5 shelter tent pins.

(*b*) For each enlisted man individually mounted, in addition to (*a*)—

- 1 saddle, cavalry, complete.
- 1 saddle cover.
- 1 saddle bag.
- 1 saddle cloth.
- 2 spurs.
- 2 spur straps.
- 1 curb bridle, complete.
- 1 currycomb.
- 1 horse brush.
- 1 link.
- 1 watering bridle.

(*c*) For each driver in addition to (*a*)—

- 1 currycomb.
- 1 horse brush.
- 1 haversack.
- 1 haversack strap.

(*d*) For each dismounted man, in addition to (*a*)—
- 1 haversack.
- 1 haversack strap.

(*e*) Equipment for each horse—
- 1 saddle blanket.
- 1 halter complete.
- 1 nose bag.
- 1 surcingle.
- 1 horse cover.

(*f*) Equipment for each mule—
- 1 halter, complete.
- 1 nose bag.

(*g*) For each pack mule, in addition to (*f*)—
- 1 aparejo, complete.

Service Kit.

758. The service kit for men of field and field wireless companies, Signal Corps, comprising the field kit and the surplus kit, is as follows:

(*a*) The field kit comprises, in addition to the clothing worn on the person, the following article:

Clothing, etc.—
- 1 overcoat.
- 1 blanket.
- 1 comb.
- 1 housewife.
- 1 slicker.
- 1 soap, cake.
- 1 stockings, pair.
- 1 toothbrush.
- 1 towel.

Rations—
- 2 haversack rations.
- 1 emergency ration.

(*b*) The surplus kit consists of:
- 1 drawers, pair.
- 1 shoes, marching, pair.
- 2 stockings, pairs.
- 1 undershirt.

Arms and equipments, as prescribed in paragraph 1, excepting—
  1 waist belt.
  1 revolver cartridge box.
  1 saddle cover.
  1 saddle cloth.
  1 horse cover.
Ammunition—
  20 rounds revolver cartridges, ball.

Technical Equipment.

759. The technical equipment for enlisted men of a field company, Signal Corps, is as follows:

(*a*) Each enlisted man carries on the person 1 electrician's knife, 1 pair of 5-inch pliers.

(*b*) Chiefs of sections will carry, in addition to (*a*), 1 field glass, Type D, a wrist watch, map case and map, a field message book, a pencil, and a compass.

(*c*) Operators will carry, in addition to (*a*): Of wire sections—1 field buzzer (when not carried on the wire cart), 1 connector, buzzer, 1 ground rod, 1 wrist watch, 1 field message book, and 25 message envelopes, 2 pencils, 1 small roll of tape, 1 cipher disk. Of wireless stations—1 wrist watch, and also field message books, 25 message envelopes, 2 pencils, cipher disk and tape in the pack chests.

(*d*) Linemen will carry, in addition to (*a*), 1 wire pike, 1 cavalry buzzer, 1 connector, buzzer, 1 ground rod, 1 carrier with buzzer wire, 1 small roll of tape. The pike will not be carried at ceremonies except at mounted inspection.

(*e*) Messengers will carry, in addition to (*a*): Of wire sections—1 field message book, 1 pencil, 1 small roll of tape, 1 box of wind matches, and, when not carried on the wire cart, a lantern, 3 candles, and box of wind matches. Of wireless sections—1 field message book, 1 pencil.

(*f*) Horseholders will carry, in addition to (*a*): Of wire sections—1 small roll of tape, and, when not carried on the wire cart, a lantern, 3 candles, and a box of wind matches.

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